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DEANE, RUTHVEN, 112 W. Adams St., Chicago, Ill. 1883
DWIGHT, DR. JONATHAN, 43 W. 70th, St., New York, N. Y. . . (1883)1886
FISHER, DR. ALBERT K., Biological Survey, Washington, D. C. . . Founder
FLEMING, JAMES H., 267 Rusholme Road, Toronto, Ontario. . . (1893)1916
FORBUSH, EDWARD H., State House, Boston, Mass. . . . . (1887)1912
FUERTES, LOUIS A., 201 Wyckoff Ave., Ithaca, N. Y. . . . . (1891)1912
GRINNELL, DR. GEORGE BIRD, 238 E. 15th St., New York, N. Y. 1883
GRINNELL, DR. JOSEPH, Mus. Vert. Zool., Univ. Calif., Berkeley, Calif. (1894)1901
JONES, LYNDS, Spear Laboratory, Oberlin, Ohio. . . . . (1888)1905
LOOMIS, LEVERETT M., Cal. Acad. Sci., San Francisco, Calif. . . (1883)1892

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[2] Dates in parentheses indicate dates of joining the Union.

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MCATEE, WALDO LEE, Biological Survey, Washington, D. C...(1903)1914
*MCGREGOR, RICHARD C., Bureau of Science, Manila, P. I...(1889)1907
MERRIAM, DR. C. HART, 1919 16th St., N. W., Washington, D. C..Founder
MILLER, W. DEWITT, Am. Mus. Nat. Hist., New York, N. Y..(1896)1914
MURPHY, DR. ROBERT C., Amer. Mus. Nat. Hist., New York, N. Y. (1905)1920
NEHRLING, H., Naples-on-the-Gulf, Lee Co., Fla.....1883
NELSON, DR. E. W., Biological Survey, Washington, D. C.....1883
OBERHOLSER, DR. HARRY C., Biol. Survey, Washington, D. C..(1888)1902
OSGOOD, DR. WILFRED H., Field Mus. Nat. Hist., Chicago, Ill...(1893)1905
*PALMER, DR. T. S., 1939 Biltmore St., N. W., Washington, D. C. (1888)1901
RICHMOND, DR. C. W., U. S. Nat. Mus., Washington, D. C.....(1888)1897
RIDGWAY, ROBERT, Route 7, Olney, Ill.....Founder
RILEY, JOSEPH H., U. S. Nat. Mus., Washington, D. C.....(1897)1919
ROBERTS, DR. THOMAS S., Univ. of Minnesota, Minneapolis, Minn...1883
*SAGE, JOHN H., Portland, Conn.....1883
SAUNDERS, WILLIAM E., 240 Central Ave., London, Ontario.....1883
SHUFELDT, DR. R. W., 3356 18th St., N. W., Washington, D. C. Founder
*STONE, DR. WITMER, Acad. Nat. Sciences, Philadelphia, Pa...(1885)1892
SWARTH, HARRY S., 2800 Prince St., Berkeley, Calif.....(1900)1916
TAVERNER, PERCY A., Victoria Memorial Mus., Ottawa, Can...(1902)1917
TODD, W. E. CLYDE, Carnegie Museum, Pittsburgh, Pa.....(1890)1916
TOWNSEND, DR. CHARLES W., 98 Pinckney St., Boston, Mass...(1901)1923
WETMORE, DR. ALEXANDER, Biol. Survey, Washington, D.C...(1908)1919
WIDMANN, OTTO, 5105 Enright Ave., St. Louis, Mo.....1884

RETIRED FELLOWS.

FISHER, PROF. W. K., Hopkins Marine Sta., Pacific Grove, Calif.(1899)1920
HENSHAW, HENRY W., The Ontario, Washington, D. C.....(1883)1918
LAWRENCE, NEWBOLD T., Lawrence, N. Y.....(1883)1913
LUCAS, DR. FREDERIC A., Am. Mus. Nat. Hist., New York, N. Y. (1888)1921
STEJNEGER, DR. LEONHARD, U. S. Nat. Mus., Washington, D. C. (1883)1911

HONORARY FELLOWS.

BAKER, E. C. STUART, Chief Police Office, West India Docks, London, E. 14, England.....(1918)1920
CAMPBELL, ARCHIBALD JAMES, "Bulgaroo," Wellington Road Box Hill, Victoria, Australia.....(1902)1921
CLARKE, DR. WILLIAM EAGLE, 53 North Castle St., Edinburgh, Scotland.....(1889)1921

DABBENE, DR. ROBERTO, Museo Nacional, Buenos Aires, Argentina (1916)1918
EVANS, DR. ARTHUR H., 9 Harvey Road, Cambridge, England. (1899)1917
GADOW, DR. HANS FRIEDRICH, Cleramendi, Great Shelford, near Cambridge, England. . . . . (1884)1916
HAAGNER, ALWIN KARL, Zoological Gardens, Box 754, Pretoria, Transvaal, South Africa. . . . . (1916)1918
HALL, ROBERT, Tasmanian Museum, Hobart, Tasmania. . . . . (1916)1923
HARTERT, DR. ERNST J. O., Zoological Museum, Tring, Herts, England. . . . . (1891)1902
HELLMAYR, DR. CARL E., Field Mus. Nat. Hist., Chicago, Ill. . . (1903)1911
IHERING, DR. HERMANN VON, Budingen Ober Hessen, Germany. (1902)1911
JOURDAIN, REV. FRANCIS CHARLES ROBERT, Appleton Rectory, Abingdon, Berks, England. . . . . (1918)1921
KURODA, NAGAMICHI, Fukuyoshi Cho, Akasaka, Tokyo, Japan. (1918)1921
LÖNNBERG, DR. A. J. EINAR, Naturhistoriska Riksmuseum, Vetenskapsakademien, Stockholm, Sweden. . . . . (1916)1918
LOWE, DR. PERCY R., Brit. Mus. (Nat. Hist.), Cromwell Road, London, S. W. 7, England. . . . . (1916)1920
MENEGAUX, DR. HENRI AUGUSTE, Museum d'Histoire Naturelle, 55 Rue de Buffon, Paris, France. . . . . (1916)1918
PYCRAFT, WILLIAM PLANE, British Museum (Nat. Hist.), Cromwell Road, London, S. W. 7, England . . . . . (1902)1911
REICHENOW, DR. ANTON, Wrangelstr., 16, Hamburg 11, Germany (1884)1891
ROTHSCHILD, LORD LIONEL WALTER, Zoological Museum, Tring, Herts, England. . . . . (1898)1913
SCHALOW, PROF. HERMAN, Hohenzollerndamm 50, Berlin-Grünewald, Germany. . . . . (1884)1911
SCLATER, WM. LUTLEY, 10 Sloane Court, Chelsea, London, S. W. 3, England. . . . . (1906)1917
SUSCHKIN, DR. PETER P., Acad. Sci., Zool. Mus., Petrograd, Russia. . . . . (1903)1918
VAN OORT, DR. E. D., Mus. Nat. Hist., Leyden, Holland. . . . . (1913)1919

CORRESPONDING FELLOWS.

ABBOTT, DR. WILLIAM L., 400 S. 15th St., Philadelphia, Pa. 1916
ALEXANDER, WILFRED B., Inst. Sci. and Industry, William St., Brisbane, Queensland, Australia. 1921
ALFARO, DON ANASTASIO, San José, Costa Rica. 1888
ARRIBALZAGA, ENRIQUE LYNCH, Resistencia, Chaco, Argentina. 1918
ARRIGONI DEGLI ODDI, COUNT ETTORE, Univ. of Padua, Padua, Italy. 1900
ASHBY, EDWIN, Wittunga, Blackwood, Adelaide, South Australia. . . . 1918
BANNERMAN, DAVID ARMITAGE, 60 Addison Road, London, W. 14, England. 1916

BATE, MISS DOROTHEA M. A., Bassenden House, Gordon, Berwickshire, Scotland....1920
BATES, GEO. LATIMER, Bitye, via Ebolowa, Cameroon, W. Africa....1919
BAXTER, MISS EVELYN VIDA, The Grove, Kirkton of Largo, Fifeshire, Scotland....1919
BEDDARD, FRANK EVERS, Zoöl. Soc., Regents Park, London, N. W. 8, England....1917
BERLIÒZ, JACQUES, Museum d'Histoire Naturelle, 55 Rue de Buffon, Paris, France....1923
BERTONI, DR. ARNOLDO DE WINKELREID, Puerto Bertoni, Paraguay..1919
BLAAUW, FRANS ERNST, Goorlust, 'sGraveland, Hilversum, Holland..1920
BUREAU, DR. LOUIS, École de Médicine, Nantes, France....1884
BUTLER, DR. ARTHUR G., 124 Beckenham Road, Beckenham, Kent, England....1922
BÜTTIKOFER, DR. JOHANNES, Hallwylstrasse 32, Berne, Switzerland.1886
CARRIKER, M. A., JR., Apartado 51, Santa Marta, Colombia.(1907) 1912
CARTER, THOMAS, Wensleydale, Mulgrave Rd., Sutton, Surrey, England....1921
CHAPMAN, ABEL, Houxty, Wark-on-Tyne, Northumberland, England.1921
CHISHOLM, A. H., Daily Telegraph, Sydney, N. S. W., Australia....1922
CHUBB, CHARLES, British Museum (Nat. Hist.), Cromwell Road, London, S. W. 7, England....1911
COLLINGE, DR. WALTER E., The Museum, York, England....1918
CONTRERAS, MARCEL DE, 52 Place Georges Brugmann, Brussels, Belgium....1923
DALGLEISH, JOHN J., Brankston Grange, Bogside Station, Alloa, Scotland....1883
DELACOUR, JEAN, Château de Clères, Seine Inférieure, France....1920
DOLE, SANFORD B., Honolulu, Hawaii....1883
FERRARI-PEREZ, PROF. FERNANDO, Tacubaya, D. F., Mexico....1885
FREKE, PERCY EVANS, South Point, Limes Road, Folkstone, England.1883
GEE, NATHANIEL GIST, China Medical Board, Pekin, China....1919
GHIGI, DR. ALESSANDRO, R. Univ., Bologna, Italy....1921
GLADSTONE, CAPT. HUGH S., Capenoch, Thornhill, Dumfries-shire, Scotland....1923
GRANT, MAJOR CLAUDE HENRY BAXTER, c/o chief Sect'y to Govt., Dar-es-Salaam, Tanganyika Ter., E. Africa....1920
GROTE, HERMANN, Wiesbadenerstrasse 4, Berlin-Friedenau, Germany.1923
GYLDENSTOLPE, COUNT NILS, Naturhistoriska Riksmuseum, Vetenskapsakademien, Stockholm, Sweden....1918
HARTING, JAMES EDMUND, Portmore Lodge, Weybridge, Surrey, England....1883
HAVILAND, MISS MAUD D., Old Hall, Newnham College, Cambridge, England....1920
HELMS, DR. O., Sanatoriet ved Nakkeböllefjord pr Pejruk, Denmark.1920

HENNICKE, DR. CARL R., Gera, Reuss, Germany.....1907
HENSON, HARRY V., c/o Hong Kong and Shanghai Banking Corp., 9 Grace Church St., London, E. C., England.....1888
HULL, ARTHUR FRANCIS BASSETT, Box 704, Sydney, N. S. W.....1919
INGRAM, CAPT. COLLINGWOOD, The Grange, Benenden, Cranbrook, Kent, England.....1920
IREDALE, TOM, c/o Australian Museum, Sydney, Australia.....1918
KLOSS, CECIL BODEN, Kuala Lumpur, Federated Malay States....1918
LATOUCHE, JOHN DAVID DIGUES, St. Davids, Greystones, Co. Wicklow, Ireland.....1921
LAUBMANN, DR. ALFRED, Zool. Staatssammlung, Neuhauser-strasse 51, Munich, Germany..... 1923
LAVAUDEN, LOUIS, Villa Jouvence, 12 Rue de Cronstadt, Tunis, Tunisia.....1923
LEACH, DR. JOHN ALBERT, Eyrecourt, Canterbury, Victoria, Australia.1919
LODGE, GEORGE EDWARD, Hawkhouse, Park Road, Camberley, Surrey, England.....1921
LUCANUS, FRIEDRICH C. H. VON, Invalidenstrasse 43, Berlin N. 4, Germany.....1923
MACGILLIVRAY, DR. WILLIAM D., Broken Hill, New South Wales, Australia.....1922
MADARÁSZ, DR. JULIUS VON, Matyas-ter 14, Budapest, Hungary....1884
MARIA, HERMANO APOLINAR, Instituto de la Salle, Bogota, Colombia.1921
MATHEWS, GREGORY M., Foulis Court, Fair Oak, Hants, England...1911
MATTINGLY, ARTHUR HERBERT E., 42 Canterbury Road, Camberwell, Melbourne, Australia.....1921
MEINERTZHAGEN, MRS. ANNIE C., 17 Kensington Park Gardens, London, W. 11, England.....1919
MEINERTZHAGEN, COL. RICHARD, 17 Kensington Park Gardens, London, W. 11, England.....1921
MENZBIER, PROF. DR. MICHAEL, University for Women, Devitchje, Pola, Moscow, Russia.....1884
MILLAIS, JOHN GUILLE, Compton's Brow, Horsham, Sussex, England.1911
MITCHELL, DR. P. CHALMERS, Zoological Society, Regents Park, London, N. W. 8, England.....1919
MOFFETT, LACY I., 5 Quinsan Gardens, Shanghai, China.....1919
NICHOLSON, FRANCIS, Ravenscroft, Windermere, Westmoreland, England.....1884
NICOLL, MICHAEL JOHN, Valhalla House, Zool. Gardens, Giza, Egypt.1919
OGILVIE-GRANT, WILLIAM ROBERT, Farley Hill Cottage, Reading, England.....1899
OLIVER, DR. W. R. B., Director Dominion Museum, Wellington, N. Z.1923
PHILLIPS, MONTAGU AUSTIN, 57 St. George's Sq., London, S. W., England.....1919
RAMSDEN, DR. CHARLES T., Box 146, Guantanamo, Cuba....(1912) 1918

RIBEIRO, DR. ALIPIO DE MIRANDA, Theresopolis, Estado de Rio Janeiro, Brazil.....1921
RINTOUL, MISS LEONORE JEFFREY, Lahill Largo, Fifeshire, Scotland..1919
ROBERTS, AUSTEN, Pretoria, Transvaal, South Africa.....1920
ROBINSON, HERBERT C., Selangor State Museum, Kuala Lumpur, Federated Malay States.....1918
SCHAANNING, H. T. L., Stavanger Museum, Stavanger, Norway....1923
SCHÖLER, DR. E. LEHN, Uraniavej 14–16, Copenhagen, Denmark....1920
SETH-SMITH, DAVID, 34 Elsworthy Road, South Hampstead, London, N. W. 3, England.....1920
SIMON, EUGENE LOUIS, 16 Rue Villa Said, Paris 16e, France.....1923
SNETHLAGE, DR. EMILIA, Mus. Nac., Rio Janeiro, Brazil.....1915
SNOUKAERT VON SCHAUBURG, BARON RENÉ C. E. G. J. VAN, 65 Rue du Prince Royal, Brussels, Belgium.....1920
STRESEMAN, DR. ERWIN, Königl. Museum für Naturkunde, Invalidenstrasse 43, Berlin, Germany.....1922
SWANN, H. KIRKE, Thorncombe, Lyonsdown Road, New Barnet, Herts, England.....1919
SWYNNERTON, C. F. M., Game Warden, Dar-es-Salaam, Tanganyika Ter., East Africa.....1918
THEEL, DR. JOHAN HJALMAR, University of Upsala, Upsala, Seden..1884
THOMSON, DR. A. LANDSBOROUGH, 9 Addison Gardens, Kensington, London, W. 14, England.....1922
TICEHURST, DR. CLAUD B., Grove House, Lowestoft, England.....1922
TICEHURST, N. F., 24 Pevensey Road, St. Leonards-on-Sea, England..1918
TURNER, MISS EMMA L., Langton Close, Girton, Cambridge, England.1920
UCHIDA, SEINOSUKE, No. 1, 7-chome, Aoyama, Kitamachi, Tokyo, Japan.....1919
VAN SOMEREN, DR. VICTOR G. L., Box 140, Nairobi, Kenya Colony, East Africa.....1921
WHISTLER, HUGH, Battle, Sussex, England.....1921
WHITE, HENRY LUKE, Belitrees, Scone, New South Wales.....1920
WHITE, CAPT. SAMUEL ALBERT, Wetunga, Fulham, South Australia..1919
WITHERBY, HARRY FORBES, 12 Chesterford Gardens, Hampstead, London, N. W. 3, England.....1916
WORCESTER, PROF. DEAN C., Manila, P. I.....1903
ZEDLITZ, COUNT OTTO VON, Tofhult bei Kalfsjöholm, Västergötland, Sweden.....1923

MEMBERS.

*** Life Members.**

ALLEN, FRANCIS H., 2 Park St., Boston, Mass.....(1888)1901
ANDERSON, DR. R. M., Mus. Geol. Survey, Ottawa, Canada..(1907)1914
ATTWATER, H. P., 2120 Genesee St., Houston, Texas.....(1891)1901

BAILEY, VERNON, 1834 Kalorama Road, Washington, D. C...(1887)1901
BAILEY, MRS. VERNON, 1834 Kalorama Road, Washington, D. C.....(1885)1901
BAILY, WILLIAM L., 220 E. Lancaster Road, Ardmore, Pa.....(1886)1901
*BALDWIN, S. PRENTISS, 11025 East Boulevard, Cleveland, Ohio.(1917)1921
BARBOUR, DR. THOMAS, Mus. Comp. Zoology, Cambridge, Mass.....(1903)1914
BARTSCH, DR. PAUL, U. S. Nat. Museum, Washington, D. C...(1896)1902
BECK, ROLLO HOWARD, c/o Amer. Consul, Papeete, Tahiti....(1894)1917
BOND, FRANK, 3027 Newark St., N. W., Washington, D. C....(1887)1901
BOWLES, JOHN HOOPER, The Woodstock, Tacoma, Wash.....(1891)1910
BRAISLIN, DR. WILLIAM C., 425 Clinton Ave., Brooklyn, N. Y..(1894)1902
BROOKS, WM. SPRAGUE, 234 Berkeley St., Boston, Mass.....(1907)1917
BRYAN, WM. ALANSON, Museum, Exposition Park, Los Angeles, Calif.....(1898)1901
BRYANT, DR. HAROLD CHILD, Mus. Vert. Zool., Berkeley, Calif..(1913)1918
BUNKER, CHARLES D., Kansas Univ. Mus., Lawrence, Kans...(1916)1923
BURNS, FRANK L., Berwyn, Pa.....(1891)1901
BUTLER, AMOS W., 52 Downey Ave., Irvington, Indianapolis, Ind.....(1885)1901
*CHAMBERS, W. LEE, Box 4, Eagle Rock, Calif.....(1907)1913
CHERRIE, GEORGE K., Newfane, Vt.....(1891–1912) (1917)1918
CLARK, DR. HUBERT L., Mus. Comp. Zool., Cambridge, Mass..(1886)1902
DAWSON, WM. L., R. D. 1, Santa Barbara, Calif.....(1895)1905
DEANE, WALTER, 29 Brewster St., Cambridge, Mass.....(1897)1901
*DICKEY, DONALD R., 514 Lester Ave., Pasadena, Calif.....(1907)1922
DIXON, JOSEPH S., Univ. Calif., Berkeley, Calif.....(1917)1923
EATON, PROF. ELON HOWARD, 678 Main St., Geneva, N. Y...(1895)1907
EVERMANN, PROF. B. W., Calif. Acad. Sci., San Francisco, Calif.(1883)1901
FARLEY, JOHN A., 52 Cedar St., Malden, Mass.....(1904)1919
FINLEY, WILLIAM L., Jennings Lodge, Clackamas Co., Ore...(1904)1907
FORDYCE, GEO. L., 40 Lincoln Ave., Youngstown, Ohio.....(1901)1921
GABRIELSON, IRA N., 515 P. O. Bldg., Portland, Ore.....(1912)1920
GAULT, BENJAMIN TRUE, 564 N. Main St., Glen Ellyn, Ill....(1885)1903
GOLDMAN, EDWARD A., Biological Survey, Washington, D. C...(1897)1902
GRISCOM, LUDLOW, 37 5th Ave., New York, N. Y.....(1908)1918
GROSS, DR. ALFRED O., Bowdoin College, Brunswick, Me.....(1907)1922
HARPER, FRANCIS, Zool. Lab., Cornell Univ., Ithaca, N. Y....(1907)1917
*HARRIS, HARRY, 18 West 52nd St., Kansas City, Mo.....(1911)1919
HERRICK, PROF. FRANCIS H., Adelbert College, Cleveland, O...(1913)1919
HERSEY, F. SEYMOUR, 6 Maple Ave., Taunton, Mass.....(1911)1916
HOFFMAN, RALPH, Santa Barbara School, Carpenteria, Calif...(1893)1901
HOLLISTER, NED, Nat. Zoölogical Park, Washington, D. C....(1894)1910
*HOWELL, A. B., 770 S. Pasadena Ave., Pasadena, Calif.....(1909)1916
HOWELL, ARTHUR H., 2919 S. Dakota Ave., Washington, D. C..(1889)1902

HUBER, WHARTON, 225 St. Marks Sq., Philadelphia, Pa .....(1915)1922
JACOBS, J. WARREN, 404 S. Washington St., Waynesburg, Pa...(1889)1904
JEFFRIES, WILLIAM A., 11 Pemberton Square, Boston, Mass...(1883)1901
JOB, HERBERT K., 601 Washington Ave., West Haven, Conn...(1896)1901
KALMBACH, EDWIN R., Biological Survey, Washington, D. C...(1910)1915
*KENNARD, F. H., Dudley Road, Newton Centre, Mass.....(1892)1912
KNOWLTON, DR. F. H., U. S. Nat. Mus., Washington, D. C...(1883)1902
*LAW, J. EUGENE, Box 181, Altadena, Calif.....(1907)1916
LINCOLN, F. C., Biological Survey, Washington, D. C.....(1910)1921
MACKAY, GEORGE H., 110 State St., Room 203, Boston, Mass..(1890)1901
MAILLIARD, JOHN W., 230 California St., San Francisco, Calif..(1895)1901
MILLER, DR. LOYE HOLMES, Southern Branch Univ. Calif., Los Angeles, Calif.....(1918)1920
MOORE, ROBERT THOMAS, 516 Detweiler Bldg., Los Angeles, Calif.....(1898)1914
MORRIS, ROBERT O., 82 Temple St., Springfield, Mass.....(1888)1904
MURDOCH, JOHN, 16 High Rock Way, Allston, Mass.....(1883)1903
NICHOLS, JOHN T., Am. Mus. Nat. Hist., New York, N. Y....(1901)1910
NORTON, A. H., Mus. Nat. Hist., 22 Elm St., Portland, Me...(1890)1902
PEARSON, T. GILBERT, 1974 Broadway, New York, N. Y.....(1891)1902
PENARD, THOMAS E., 12 Norfolk R'd, Arlington, Mass.....(1912)1919
PENNOCK, CHAS. J., Kennett Square, Pa.....(1888)1901
PETERS, JAMES LEE, Harvard, Mass.....(1904)1918
PHILLIPS, DR. JOHN C., Wenham, Mass.....(1904)1912
PREBLE, EDWARD A., Biological Survey, Washington, D. C...(1892)1901
RATHBUN, SAMUEL F., 217 14th Ave. N., Seattle, Wash.....(1893)1902
RHOADS, SAMUEL N., 81 Haddon Ave., Haddonfield, N. J....(1885)1901
RIVES, DR. WM. C., 1702 R. I. Ave., Washington, D. C.....(1885)1901
ROBINSON, COL. WIRT, U. S. A., West Point, N. Y.....(1897)1901
*ROGERS, CHARLES H., Nassau Inn, Princeton, N. J.....(1904)1921
SAUNDERS, ARETAS A., 48 Longview Ave., Fairfield, Conn.....(1907)1920
SETON, ERNEST THOMPSON, Greenwich, Conn.....(1883)1901
*SHERMAN, MISS ALTHEA R., National via McGregor, Iowa..(1907)1912
*SHIRAS, HON. GEORGE, 3D, Stoneleigh Court, Washington, D. C.....(1907)1915
SIMMONS, GEO. FINLAY, Cleveland Mus., 2717 Euclid Ave., Cleveland, O.....(1910)1923
STEPHENS, FRANK, Nat. Hist. Museum, San Diego, Calif.....(1883)1901
STEPHENS, PROF. T. C., Morningside College, Sioux City, Iowa.(1909)1920
STORER, PROF. TRACY IRWIN, Univ. Farm, Davis, Calif.....(1916)1922
STRONG, DR. REUBEN M., 706 S. Lincoln St., Chicago, Ill.....(1889)1903
*SWALES, B. H., U. S. Nat. Mus., Washington, D. C.....(1902)1909
SWENK, MYRON W., 1410 N. 37th St., Lincoln, Neb.....(1904)1920
THAYER, JOHN ELIOT, Lancaster, Mass.....(1898)1905
TOWNSEND, DR. CHARLES H., Aquarium, Battery Park, New York, N. Y.....(1883)1901

TROTTER, DR. SPENCER, Darlington & Miner Sts., West Chester, Pa. . . . . (1888)1901
*TYLER, DR. WINSOR M., 522 Mass. Ave., Lexington, Mass. . . (1912)1917
WARREN, E. R., 1511 Wood Ave., Colorado Springs, Colo. . . . . (1902)1910
WAYNE, ARTHUR T., Mt. Pleasant, S. C. . . . . (1905)1906
WILLETT, GEORGE, Ketchikan, Alaska . . . . . (1912)1913
*WILLIAMS, ROBERT WHITE, Dept. Agric., Washington, D. C. . . (1900)1918
WOLCOTT, DR. ROBERT H., State University, Lincoln, Neb. . . (1901)1903
*WOOD, DR. CASEY A., 7 W. Madison St., Chicago, Ill. . . . . (1917)1921
WOOD, NORMAN A., Museum Univ. of Mich., Ann Arbor, Mich. (1904)1912
WRIGHT, DR. ALBERT H., Upland Road, Ithaca, N. Y. . . . . (1906)1919
WRIGHT, MRS. MABEL OSGOOD, Box 32, Fairfield, Conn. . . . . (1895)1901
ZIMMER, JOHN T., Field Mus. Nat. Hist., Chicago, Ill. . . . . (1908)1922

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* Life Associates.

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ABBOT, HENRY W., 317 Dartmouth St., Boston, Mass. 1922
ABBOTT, CLINTON GILBERT, Nat. Hist. Mus., Balboa Park, San Diego, Calif. 1898
ABBOTT, CYRIL EDWARD, 24 S. Liberty St., Elgin, Ill. 1923
ABBOTT, MISS HARRIET, P. O. Box 125, Fryeburg, Me. 1918
ABBOTT, WALDO L., Hotel Somerset, Boston, Mass. 1921
ACHORN, DR. JOHN WARREN, Pine Bluff, N. C. 1921
ADAMS, BENJAMIN, Wethersfield, Conn. 1911
ADAMS, DR. CHARLES E., 29 W. Broadway, Bangor, Me. 1922
ADAMS, REV. CHARLES L., New Canaan, Conn. 1920
ADAMS, HOWARD S., Elm St., R. F. D. 168, Walpole, Mass. 1923
ADAMS, IVERS S., 98 Washington St., Dorchester, Mass. 1923
ADAMS, WILLIAM C., 43 Clyde St., Newtonville, Mass. 1920
ADAMS, DR. Z. B., 43 Cottage Farm Road, Brookline, Mass. 1908
ADELMANN, HOWARD BERNHARDT, Stimson Hall, Cornell Univ., Ithaca, N. Y. 1919
AGASSIZ, R. L., Hamilton, Mass. 1922
AHRENS, DR. T. G., Boothstrasse 21, Berlin, Lichterfelde-Ost, Germany. 1920
AIMAR, DR. CHARLES PONS, 4 Vanderhorst St., Charleston, S. C. 1916
AITKEN, A. D., JR., 766 Milwaukee St., Denver, Colo. 1923
ALBERT, OSCAR P., R. R. I., McGregor, Iowa 1923
*ALEXANDER, MISS ANNIE M., Box 248, Suisun City, Calif. 1911
ALEXANDER, EDWARD GORDON, Box 343, Marshall, Mo. 1919
ALLEN, MRS. AMELIA SANBORN, 37 Mosswood R'd, Berkeley, Calif. . . 1919
ALLEN, ARTHUR F., Box 717, Sioux City, Iowa 1919
ALLEN, GEORGE E., Plainfield, Mass. 1922

ALLEN, LAWRENCE E., Albion, Iowa....1923
ALLEN, ROBERT PORTER, Lafayette College, Easton, Pa....1922
ANDERSON, CHAS. J., 24 Eddywood Ave., Springfield, Mass....1922
ANDERSON, EDWIN C., Dell Rapids, S. D....1919
ANDERSON, MRS. J. C., Great Barrington, Mass....1903
ANGELL, WALTER A., 33 Westminster St., Providence, R. I....1901
ANKENEY, MISS HELEN, Rt. 10, Xenia, Ohio....1920
ANTHONY, H. E., Amer. Mus. Nat. Hist., New York, N. Y....1911
ARMSTRONG, EDWARD E., 2249 Calumet Ave., Chicago, Ill....1904
ARNOLD, EDWARD, Canadian Nat'l R'ys., Montreal, Quebec....1894
ARNOLD, DR. H. D., 1559 Beacon St., Brookline, Mass....1923
ARTHUR, EDMUND WATTS, 7438 Perrysville Ave., Ben Avon, Pittsburgh, Pa....1919
ARTHUR, STANLEY CLISBY, 6043 Perrier St., New Orleans, La....1916
ASPINWALL, MRS. CLARENCE A., 1839 Wyoming Ave., Washington, D. C....1916
ATHERTON, EDWARD H., 22 Aldworth St., Jamaica Plain, 30, Mass....1917
ATWELL, GEORGE C., Strafford, N. H....1920
AVERILL, CHARLES KETCHUM, 159 Hazelwood Ave., Bridgeport, Conn. 1919
AYRES, DOUGLAS, JR., Fort Plain, N. Y....1922
AYRES, MISS MARY ADELINE, 119 High St., Medford, 55, Mass....1915
BABCOCK, CLYDE H., 3426 W. Kiowa St., Colo. Springs, Colo....1920
BABCOCK, DEAN, Long's Peak, Colo....1911
BACON, BRASHER C., Madisonville, Ky....1922
BACON, FRANCIS L., 236 Winona Ave., Germantown, Pa....1917
BADÉ, DR. WM. FREDERIC, 2616 College Ave., Berkeley, Calif....1916
BADGER, LESTER R., 2401 Lake Place, Minneapolis, Minn....1920
BAER, JOHN L., Nat. Mus., Washington, D. C....1920
*BAGG, AARON C., 70 Fairfield Ave., Holyoke, Mass....1916
BAGG, EGBERT, 406 Genesee St., Utica, N. Y....1916
BAGG, JOHN LEONARD, 89 Lexington Ave., Holyoke, Mass....1918
BAILEY, PROF. GUY A., Geneseo, N. Y....1910
BAILEY, MRS. H. M., 2109 Nebraska St., Sioux City, Iowa....1922
BAILEY, MISS LEONE, Ingallston, Mich....1922
BAILEY, SAMUEL WALDO, Cold Spring Road, Williamstown, Mass....1909
BAILLIE, JAMES L., Mus. Zool., Toronto, Ont....1923
BAIRD, MISS KATHARINE B., 815 Webster St., N. W., Washington, D. C....1918
BAIRD, ROBERT LOGAN, 279 Oak St., Oberlin, Ohio....1921
BAKER, FRANK L., 42 Rosemont St., Dorchester, Mass....1922
BAKER, JACK D., Willets, Mendocino Co., Calif....1920
BALES, DR. BLENN R., 149 W. Main St., Circleville, Ohio....1907
BALL, MRS. BENNETT F., Oakville, Conn....1905
BALL, EDWARD M., Bureau of Fisheries, Washington, D. C....1918
BALL, HOWARD, 1233 Irving St., N. W., Washington, D. C....1923
BALL, DR. JOS. P., 5001 Frankford Ave., Philadelphia, Pa....1911

BARBER, PROF. BERTRAM A., 350 West St. North, Hillsdale, Mich...1920
BARBOUR, REV. ROBERT, Box 224, Montclair, N. J.....1902
BARCLAY, WILLIAM, Barre, Vermont.....1921
BARKER, MISS HELEN, 421 E. Adams St., Sandusky, O.....1918
BARLOW, HENRY HOYT, 1707 Kilbourne St., N. W., Washington, D. C. 1921
BARNARD, T. W., 46 Norfolk Road, Arlington, Mass.....1921
BARNES, CHARLES SYDNEY, 104 West 37th. St., Bayonne, N. J.....1920
BARNES, CLAUDE T., 359 Tenth Ave., Salt Lake City, Utah.....1908
BARNES, HON. R. MAGOON, Lacon, Ill.....1889
BARRETT, CHAS. H. M., 1339 Valley Place S. E., Washington, D. C...1912
BARRETT, HAROLD LAWRENCE, 172 Huntington Ave., Boston, Mass...1909
BARRY, MISS ANNA K., 5 Bowdoin Ave., Dorchester, 21, Mass.....1907
BARTLETT, MISS MARY F., 227 Commonwealth Ave., Boston, 17, Mass. 1912
BARTON, FRANCIS CARROLL, Hotel Tracy, Philadelphia, Pa.....1923
BARTRAM, EDWIN B., Bushkill, Pike Co., Pa.....1913
BASCOM, H. P., Stockton, St. Michael, Barbados, B. W. I.....1922
BASSETT, FRANK NEWTON, 1338 Eighth St., Alameda, Calif.....1919
BATCHELOR, MRS. E. C., Narberth, Pa.....1922
BATEMAN, ROBERT EDWARD, Box 1251, Billings, Montana.....1923
BATES, MISS EMELINE CLARK, 59-69 Scott St., Chicago, Ill.....1920
BATES, REV. J. M., Red Cloud, Neb.....1918
BATTEN, GEORGE, 15 University Place, Princeton, N. J.....1914
BATTERSBY, HERMAN WM., Oak Lake, Manitoba.....1922
BAYNES ERNEST HAROLD, Meriden, N. H.....1918
BEACH DR. CHAS. C., 54 Woodland St., Hartford, Conn.....1922
BEARD, THEODORE R., Box 428, Boulder, Colo.....1920
BEAUPRE, EDWIN, Princess St., Kingston, Ont.....1922
BECK, HERBERT H., Lititz, Lancaster Co., Pa.....1921
BECK, JOSEPH N., Remsen, Iowa.....1923
BEDELL, EDGAR, 45 Middle St., Waterford, N. Y.....1922
BELL, DR. W. B., 803 Rittenhouse St., Washington, D. C.....1912
BENJAMIN, MRS. ALFRED, 350 Summer Ave., Newark, N. J.....1920
BENNETT, REV. GEORGE, Iowa City, Iowa.....1913
BENSON, FRANK W., 46 Washington Sq., Salem, Mass.....1920
BERLIN, MRS. CORA D., 423 Fourth St., Marietta, Ohio.....1920
BERRY, ORVILLE P., 735 College St., Bedford City, Va.....1922
BICKNELL, MRS. F. T., 319 S. Normandie Ave., Los Angeles, Calif...1913
BIDDLE, MISS EMILY W., 1828 Delancey Place, Philadelphia, Pa....1898
*BIGELOW, MRS. A. P., Ogden, Utah.....1919
BIGELOW, HOMER LANE, 37 Old Orchard Road, Chestnut Hill, Mass.1902
BIGELOW, DR. LYMAN F., 80 Winter St., Norwood, Mass.....1914
BIGELOW, DR. WILLIAM STURGIS, 56 Beacon St., Boston, Mass.....1920
BILL, DEAN E. GORDON, 32 Occom Ridge, Hanover, N. H.....1922
BISHOP, MRS. BESSIE F., Lyonsdale, Lewis Co., N. Y.....1922
BISHOP, SHERMAN C., N. Y. State Museum, Albany, N. Y.....1919

BIXBY, HENRY D., Huntington, L. I., N. Y.....1922
BLACKWELDER, ELIOT, Stanford University, Calif.....1895
BLAKE, BENJAMIN S., Auburndale 66, Mass.....1920
BLAKE, DR. IRVING H., 38 North Main St., Orono, Me.....1922
BLAKE, S. F., Bureau of Plant Industry, Dept. Agr., Washington, D. C.1923
BLINCOE, BENEDICT J., Rt. 13, Dayton, Ohio.....1921
BLOOMFIELD, MRS. C. C., 729 West Main St., Jackson, Mich.....1901
BOARDMAN, MISS E. D., 417 Marlborough St., Boston, Mass.....1906
BODE, MRS. GULIELMA H., 1900 Maryland Ave., Baltimore, Md.....1922
BODINE, MRS. DONALDSON, 4 Mills Place, Crawfordsville, Ind.....1916
BOEHNER, REGINALD STEPHEN, Syracuse Univ., Syracuse, N. Y.....1919
BOESEL, MARION WATERMAN, 415 S. Washington St., New Bremen, Ohio.....1922
BOETTNER, HENRY, 127 N. Murat St., New Orleans, La.....1923
BOGARDUS, MISS CHARLOTTE, Elm St., Coxsackie, N. Y.....1909
BOLT, BENJAMIN FRANKLIN, 1421 Prospect Ave., Kansas City, Mo...1909
BOLTON, C. C., 10701 East Boulevard, Cleveland, Ohio.....1923
BOND, HARRY L., Lakefield, Minn.....1908
BOND, JAMES, c/o Pennsylvania Co., 517 Chestnut St., Philadelphia, Pa.....1923
BONFILS, FREDERICK G., 1500 East 10th Ave., Denver, Colo.....1918
BONNETT, D. B., Bay Head, N. J.....1920
BOSSON, CAMPBELL, 19 Brewster St., Cambridge, ...1906
BOSTWICK, MISS PRUE, 1045 Gaylord St., Denver, Colo.....1923
BOULTON, W. RUDYERD, JR., Beaver, Pa.....1915
BOURNE, THOMAS L., 262 Long Ave., Hamburg, N. Y.....1914
BOWDEN, MRS. MARIE L., 305 Waverly St., Ottawa, Ont.....1921
BOWDISH, B. S., Demarest, N. J.....1891
BOWDISH, MRS. B. S., Demarest, N. J.....1902
BOWDITCH, DR. HAROLD, 44 Harvard Ave., Brookline, Mass.....1900
BOWEN, MAURICE S., Box 327, Middleboro, Mass.....1921
BOYCE, J. G., 442 West 9th St., Texarkana, Texas.....1923
BOYD, MRS. HARRIETT T., 17 Marsh St., Dedham, Mass.....1917
BOYLE, ASHBY D., 380 E. St., Salt Lake City, Utah.....1921
BRACKEN, MRS. HENRY M., 2205 Kenwood Parkway, Minneapolis, Minn.....1897
BRADBURY, W. C., 1440 Race St., Denver, Colo.....1915
BRADSHAW, FRED, Dept. of Agriculture, Regina, Sask.....1921
BRADY, MAURICE K., 3220 17th St., Washington, D. C.....1923
BRAINERD, DR. JOHN BLISS, 419 Boylston St., Boston, Mass.....1921
*BRANDRETH, COURTNEY, Ossining, N. Y.....1905
*BRANDRETH, FRANKLIN, Ossining, N. Y.....1889
BRANDT, HERBERT W., 2025 East 88th St., Cleveland, Ohio.....1915
BRANNON, PETER A., Box 358, Montgomery, Ala.....1919
BREDER, CHAS. M., JR., 122 N. Fourth St., Newark, N. J.....1919
BRICKENSTEIN, MISS MARY R., 1603 19th St., Washington, D. C....1920

BRIDGE, EDMUND, 52 Wyman St., West Medford, Mass.....1910
*BRIDGE, MRS. EDMUND, 52 Wyman St., West M dford, Mass.....1902
BRIGHT, STANLEY, R. F. D. 2, Reading, Pa.....1921
BRIMLEY, H. H., State Museum, Raleigh, N. C.....1904
BRISTOL, MISS F. L., 169 Columbia Heights, Brooklyn, N. Y.....1921
BROCK, DR. HENRY H., 687 Congress St., Portland, Maine.....1923
BROCKWAY, ARTHUR W., Hadlyme, Conn.....1912
BRODE, DR. H. S., 433 E. Alder St., Walla Walla, Wash.....1923
BRONSON, BARNARD S., 175 Jay St., Albany, N. Y.....1920
BROOKS, REV. EARLE AMOS, 70 Clark St., Everett, Mass.....1892
BROOKS, GORHAM, 60 State St., Boston, Mass.....1919
BROUNSTEIN, MORRIS, 36 Claremont Park, Boston, Mass.....1922
BROWN, MISS ANNIE H., 31 Maple St., Stoneham, Mass.....1909
BROWN, MISS BERTHA L., 53 Court St., Bangor, Me.....1918
BROWN, MRS. CHAS. E., 211 Audubon Road, Back Bay Station, Boston 17, Mass.....1922
BROWN, EDMUND P., 48 Union St., Belfast, Me.....1920
BROWN, EDWARD J., Box 99, Eustis, Fla.....1891
BROWN, HARRY A., 40 Talbot St., Lowell, Mass.....1912
BROWN, SAMUEL E., 10 Oakland St., Lexington, Mass.....1920
BROWN, WM. JAMES, 250 Oliver Ave., Westmount, Quebec.....1908
BROWNING, WM. HALL, 16 Cooper Square, New York, N. Y.....1911
BRUEN, FRANK, 29 High St., Bristol, Conn. 1908
BRULEY, ROGER S., 64 Center St., Danvers, Mass.....1922
BRUMBAUGH, CHALMERS S., 2606 Elsinor Ave., Baltimore, Md.....1916
*BRUUN, CHAS. J., 314 Reliance Bldg., Kansas City, Mo.....1919
BUCHANAN, CHAS. J., 320 N. Illinois St., Indianapolis, Ind.....1922
BUGBEE, E. H., Williamstown, N. J.....1921
BULL, CHARLES L., Oradell, N. J 1920
BULLOCK, D. S., El Verjel, Angol, Chile.....1920
BURBANK, MRS. DELANCEY G., 17 Cherry St., N. Adams, Mass.....1920
BURBANK, MRS. GEORGE E., Sandwich, Mass.....1922
BURGESS, DR. HENRY C., Brigham Hall, Canandaigua, N. Y.....1920
BURGESS, JOHN KINGSBURY, Chestnut St., Dedham, Mass.....1898
BURGESS, THORNTON WAI DO, 61 Washington R'd., Springfield, Mass..1919
BURLEIGH, THOS. D., Univ. of Ga., Athens, Ga.....1913
BURNELL, ELIZABETH FRAYER, 1029 Spaulding Ave., Los Angeles, Cal.1923
BURNETT, WILLIAM L., Agric. College, Fort Collins, Colo.....1895
BURNHAM, JOHN, 218 Timken Bldg., San Diego, Calif.....1920
BURNHAM, STEWART HENRY, Dept. of Botany, Cornell Univ., Ithaca, N. Y.....1919
BURNS, JAMES RANDOLPH, 645 44th St., Des Moines, Iowa.....1923
BURR, J. GUY, c/o Game and Fish Commission, Austin, Texas.....1923
BURTCH, VERDI, Branchport, N. Y.....1903
BUSH, MISS EMMA F., 50 Congress St., Boston, Mass.....1922
BUSHBY, FRED. W., 17 Washington St., Peabody, Mass.....1922

BUTCHER, HOWARD, JR., Stanfair and Wistar R'ds, Ardmore, Pa.....1921
BUTLER, EDWARD, Bains, La.....1920
BUTTERWORTH, FRANK SEILER, JR., 616 Yale Station, New Haven, Conn.....1918
BYRD, MRS. HIRAM, Bradentown, Fla.....1918
CAHN, ALVIN R., 1117 W. Nevada St., Urbana, Ill.....1917
CALDWELL, LEE, 442 Webster St., Traverse City, Mich.....1921
CALHOUN, MISS EMMA MAY, 39 Auburn St., Brookline, Mass.....1921
CALLENDER, JAMES PHILIPS, 45 Wall St., New York, N. Y.....1903
CALVERT, EARL W., c/o H. Hooey, Rt. 2, Nestleton, Ont., Canada..1919
CAMPINI, CHAS. A., 154 E. 33rd St., New York, N. Y.....1919
CANNON, GABRIEL, Spartanburg, S. C.....1920
CARLISLE, GEORGE L., JR., 550 Park Ave., New York, N. Y.....1920
CARPENTER, REV. C. K., Baileyville, Ill.....1894
CARPENTER, GEORGE I., 746 Lincoln Place, Brooklyn, N. Y.....1907
CARRIGER, H. W., 5185 Trask St., Fruitvale Station, Oakland, Calif...1913
CARTER, JOHN D., Lansdowne, Pa.....1907
CARTER, T. DONALD, Am. Mus. Nat. Hist., New York, N. Y.....1921
CARTH, MRS. JEAN E., Box 181, Back Bay, Boston, Mass.....1922
CARTWRIGHT, W. J., Williamstown, Mass.....1920
CASH, HARRY A., 420 Hope St., Providence, R. I.....1898
CHAMBERLAIN, CHAUNCY W., Hotel Hemenway, Boston, Mass.....1885
CHAMBERLAIN, EDWARD B., 182 Ashley Ave., Charleston, S. C.....1923
*CHAPIN, PROF. ANGIE C., 50 Saratoga Ave., Yonkers, N. Y.....1896
CHAPMAN, MRS. F. M., Englewood, N. J.....1908
CHASE, CHAS. E., 31 Euclid Ave., East Lynn, Mass.....1922
CHASE, RICHARD MORTON, 164 Westminister R'd, Rochester, N. Y...1919
CHASE, SIDNEY, Nantucket, Mass.....1904
CHEATHAM, ORME, Kapoa, Kauai, T. H.....1923
CHEESMAN, WM. H., Biological Survey, Washington, D. C.....1920
CHENEY, REV. R. F., St. Mark's Rectory, Southborough, Mass.....1922
CHILDS, MISS HELEN P., Chevy Chase, Md.....1922
CHILDS, HENRY EVERETT, 864 Broadway, E. Providence, R. I.....1919
CHOUTEAU, PIERRE JR., 95 Lexington Ave., Cambridge, Mass.....1923
CHRISTIE, EDW. H., 5069 Kensington Ave., St. Louis, Mo.....1920
CHRISTIE, R. T., Windsor, Nova Scotia.....1921
CHRISTOFFERSON, DR. KARL, Sault Ste. Marie, Mich.....1921
CHRISTY, BAYARD H., 403 Frederick Ave., Sewickley, Pa.....1922
CLARK, ARTHUR L., 945 Tremont Bldg., Boston, Mass.....1920
CLARK, AUSTIN HOBART, 1818 Wyoming Ave., Washington, D. C...1919
CLARK, CLARENCE H., Lubec, Me.....1913
CLARK, DR. JOSEPH P., 71 Marlborough St., Boston, Mass.....1920
CLARK, JOSIAH H., 702 E. 23rd St., Paterson, N. J.....1895
CLARKE, CHARLES E., 51 Summit R'd, Medford, Mass.....1907
CLARKE, MISS MARY S., Shadwell, Va.....1916
CLARKE, MISS ROWENA A., Kirkwood, Mo.....1919

CLEAVES, HOWARD H., 727 Goff Bldg., Clarksburg, W. Va.....1907
CLEVELAND, MRS. U. F., 150 Randall St., Downers Grove, Ill.....1922
**COALE, HENRY K., 528 S. Linden Ave., Highland Park, Ill.....1883
COBB, MISS ANNIE W., 22 Lake View, Arlington, Mass.....1909
COBB, HENRY W., 151 Rumford Ave., Mansfield, Mass.....1922
COBB, DR. STANLEY, Harvard Medical School, Boston, Mass.....1909
COBURN, MRS. LEWIS D., East Montpelier, Vt.....1921
COBURN, MARY E., R. F. D. 2, Ludlow, Mass.....1922
CODMAN, JAMES M., Box 1214, Boston, Mass.....1920
COFFIN, MRS. F H., 1528 Jefferson Ave., Scranton, Pa.....1921
COFFIN, MRS. PERCIVAL B., 5708 Kenwood Ave., Chicago, Ill.....1905
COFFIN, ROBERT L., Agric'l. Exp. Sta., Amherst, Mass.....1917
COGGINS, HERBERT L., 2929 Piedmont Ave., Berkeley, Calif.....1913
COLBURN, ALBERT E., 716 S. Flower St., Los Angeles, Calif.....1891
COLE, JOHN L., Rt. 5, Nevada, Iowa.....1920
COLE, DR. LEON J., Bur. An. Industry, Dept. Agr., Washington, D. C. 1908
COLLINS, ALFRED M., 226 Columbia Ave., Philadelphia, Pa.....1921
COLLINS, HENRY H., 28 Campbell Hall, Princeton, N. J.....1923
COMMONS, FRANK W., 608 Chamber of Commerce, Minneapolis, Minn. 1922
COMMONS, MRS. F. W., 608 Cham'r of Commerce, Minneapolis, Minn. .1902
CONGER, ALLEN C., Ohio Wesleyan Univ., Delaware, Ohio. 1919
*CONOVER, HENRY B., 6 Scott St., Chicago, Ill.....1920
COOK, MRS. ALBERT E., 4121 Sheridan Ave. S., Minneapolis, Minn...1922
COOK, FRANKLIN P., Seaside Hotel, Atlantic City, N. J.....1920
COOK, FREDERICK W., 1604 East Harrison St., Seattle, Wash.....1915
*COOKE, MISS MAY THACHER, 1328 Twelfth St., Washington, D. C...1915
COOKMAN, ALFRED, 336 W. Pioneer Drive, Glendale, Calif.....1920
COOLIDGE, PHILIP T., 31 Central St., Bangor, Me.....1919
COPE, FRANCIS R., JR., Dimock, Pa.....1892
COPELAND, MISS ADA B., 1103 White Ave., Grand Junction, Colo...1917
COPELAND, MANTON, 88 Federal St., Brunswick, Me.....1900
CORDIER, DR. A. H., 415 Benton Blv'd, Kansas City, Mo.....1920
CORNISH, MRS. A. J., 32 Brimley Court, 84 Prescott St., Cambridge, Mass.....1923
CORRINGTON, J. D., Univ. S. C., Columbia, S. C.....1921
CORYELL, SHERMAN, 1500 Hood Ave., Chicago, Ill.....1921
COUCH, LEO K., Capitol Bldg., Olympia, Wash.....1922
COUES, DR. WM. P., 12 Monmouth Court, Brookline, Mass.....1920
COULTAS, WILLIAM F., 156 Quadrangle Bldg., Iowa City, Ia.....1921
COVELL, DR. HENRY H., 1600 East Ave., Rochester, N. Y.....1918
COX, RODMAN DAYTION, 56 College Ave., Rochester, N. Y.....1919
COX, WILMOT T., 91 South Ave., New Canaan, Conn.....1922
CRABB, EDWARD DRANE, Public Museum, Milwaukee, Wis.....1922
CRABBE, MRS. MARY E., 80 Oak St., Far Rockaway, N. Y.....1921
CRAIG, GLENN C., 724 Richard St., Florence, Alabama.....1923
CRANDALL, LEE S., Zoological Park, New York, N. Y.....1909

CRANE, MISS CLARA L., Dalton, Mass.....1904
CRANE, LESLIE, 161 Holly St., Rutland, Vt.....1922
CRIDDLE, NORMAN, Treesbank, Man.....1918
CROCKER, WM. T., 263 Lexington Ave., New York, N. Y.....1920
*CROSBY, MAUNSELL S., Rhinebeck, N. Y.....1904
CROSS, ALBERT ASHLEY, Huntington, Mass.....1918
CROSS, MRS. R. J., 210 Mercer St., Princeton, N. J.....1921
CROSSMAN, ANNIE F., 49 Clinton Ave., Pittsfield, Mass.....1920
CROWELL, ANTHONY E., East Harwich, Mass.....1922
CROWELL, MISS J. OLIVIA, Dennis, Mass.....1918
CUDWORTH, WARREN H., 15 Beacon Ave., Norwood, Mass.....1919
CUMMINGS, PROF. BYRON, Univ. of Arizona, Tucson, Arizona.....1923
CUMMINGS, MISS EMMA G., 16 Kennard Road, Brookline, Mass.....1903
CUNNINGHAM, WALTER, 3009 Dunham Ave., Kansas City, Mo.....1919
CURRIE, ROLLA P., 632 Keefer Pl., Washington, D. C.....1895
CURRIER, EDMONDE SAMUEL, 416 E. Chicago St., St. John's Sta., Portland, Ore.....1894
CURRY, HASKELL BROOKS, 60 Bay State Road, Boston, 17, Mass.....1916
CURTIS, CHARLES P., 244 Beacon St., Boston, Mass.....1915
CURTIS, ROY Q., 11 W. 76th St., New York, N. Y.....1919
CUSHMAN, MISS ALICE, 919 Pine St., Philadelphia, Pa.....1910
CUTLER, MRS. FREDERICK M., Univ. of Porto Rico, Rio Piedras, P. R. 1923
CUTTER, MISS LUCIA B., JAFFREY, N. H.....1920
CUYLER, WM. KENNETH, 1216 W. 22nd St., Austin, Texas.....1923
DADISMAN, A. J., 115 Beverly Ave., Morgantown, W. Va.....1921
DALEY, MISS MARY WOOD, Darling P. O., Delaware Co., Pa.....1920
DANE, MRS. ERNEST B., Chestnut Hill, Mass.....1912
DANFORTH, STUART T., College of Agriculture, Mayagüez, Porto Rico. 1916
DANIELS, EDWARD S., 7th and Elm Sts., St. Louis, Mo.....1919
DARLEY, MRS. WM. M., Box 245, Monte Vista, Colo.....1922
DARLINGTON, P. J., JR., 1 Frost Terrace, Cambridge, Mass.....1923
DAVENPORT, MRS. ELIZABETH B., 15 Green St., Brattleboro, Vt.....1898
DAVIDSON, DR. A. M., 856 Palmerston Ave., Winnipeg, Man.....1922
DAVIDSON, MRS. FRANCES S., 1917 Emerson Ave., S., Minneapolis, Minn.....1921
DAVIS, MISS BERTHA E., 22 Cypress Place, Brookline 46, Mass.....1920
DAVIS, MRS. DANIEL R., Coram, N. Y.....1922
DAVIS, HENRY W., 10 S. Baton Rouge Ave., Ventnor, Atlantic City, N. J.....1922
DAVIS, JOHN M., 723 L. St., Eureka, Calif.....1920
DAVIS, R. N., Everhart Museum, Scranton, Pa.....1920
DAVIS, RICHARD J., 158 Pleasant St., Arlington, Mass.....1922
DAY, ALBERT M., c/o University Extension, Laramie, Wyoming....1923
DAY, CHESTER SESSIONS, 16 Browne St., Brookline 47, Mass.....1897
DAY, CLAUDE B., 210 Highfield St., Moncton, N. B.....1922
DEAN, R. H., 720 Quintard Ave., Anniston, Ala.....1913

DEANE, GEORGE CLEMENT, 80 Sparks St., Cambridge, Mass.....1899
DEARBORN, SAMUEL S., 411 Marlborough St., Boston, Mass.....1919
DECKER, F. R., Kiona, Washington.....1923
DE GARIS, DR. CHARLES F., Johns Hopkins Univ., Baltimore, Md...1923
DELOACH, R. J. H., Woodlawn Ave., Chicago, Ill.....1910
DELURY, DR. RALPH E., Dominion Observatory, Ottawa, Canada...1920
DE MILLE, JOHN B., 559 W. 183rd St., New York, N. Y.....1922
DEVANY, J L., Annapolis Royal, Nova Scotia.....1921
DENMEAD, TALBOT, 2830 St. Paul St., Baltimore, Md.....1923
DENNIS, DR. LABAN, 71 Ridge Ave., Orange, N. J.....1921
DENSMORE, MISS MABEL, 910 4th St., Red Wing, Minn.....1910
DERBY, DR. RICHARD, Oyster Bay, L. I., N. Y.....1898
DEWEY, DR. CHARLES A., 78 Plymouth Ave., Rochester, N. Y.....1900
DEWIS, DR. JOHN W., 270 Commonwealth Ave., Boston, Mass.....1920
DEXTER, PROF. JOHN SMITH, Hotel Miramar, Santurce, Porto Rico .1919
DICE, DR. LEE RAYMOND, Univ. Mus., Ann Arbor, Mich.....1918
DICKENS, MISS ELIZABETH, Block Island, R. I.....1921
DILLE, FREDERICK M., Valentine, Neb.....1892
DINGLE, EDWARD VON S., Mt. Pleasant, S. C.....1920
DIONNE, C. E., Laval University, Quebec, Canada.....1893
DIXON, FREDERICK J., 111 Elm Ave., Hackensack, N. J.....1891
DOOLITTLE, E. A., Box 44, Painesville, Ohio.....1921
DOOLITTLE, MISS MAUDE, 23 Naples Road, Brookline, Mass.....1922
DRAPER, WALLACE S., Wayland, Mass.....1920
DREIER, THEODORE, 27 Weld Hall, Cambridge, Mass.....1919
DRUMMOND, MISS MARY, 510 Spring Lane, Lake Forest, Ill.....1904
DUANE, ARTHUR, 128 E. 34th St., New York, N. Y.....1920
DUBOIS, ALEXANDER D., 327 S. Glenwood Ave., Springfield, Ill.....1918
DUER, HARRY ELDON, 519 Schofield Bldg., Cleveland, Ohio.....1921
DULL, MRS. A. P. L., P. O. Box 188, Harrisburg, Pa.....1900
DUNBAR, MISS LULA, Rt. 1, Elkhorn, Wis.....1918
DUNKELBERGER, H. W., P.O. Box 6, Flourtown, Montgomery Co., Pa. 1923
DUNN, MRS. H. A., Rt. 3, Box 63, Athol, Mass.....1920
DUNN, JOHN W. G., 1033 Lincoln St., St. Paul, Minn.....1923
DURFEE, OWEN, 727 Madison St., Fall River, Mass.....1887
DURFEE, MRS. OWEN, 727 Madison St., Fall River, Mass.....1923
DUSTIN, MISS FLORENCE S., Mason, N. H.....1922
DUVAL, WM. M., Bonaventure Isle, County Gaspé, Quebec.....1922
DYE, HAROLD G., 18 Conklin Ave., Rochester, N. Y.....1921
DYKE, ARTHUR CURTIS, 205 Summer St., Bridgewater, Mass.....1902
EADIE, GUY L., Berwyn, Pa.....1920
EANES, ROBERT H., 2404 Speedway, Austin, Texas.....1923
EARL, THOMAS M., 590 E. Spring St., Columbus, Ohio.....1921
EARLE, OSBOURNE, 17 Bates St., Cambridge, Mass.....1919
EASTMAN, COL. FRANCIS B., P. O. Box 334, Baltimore, Md.....1909
EASTMAN, MISS SARAH C., 51 Chapel St., Portland, Me.....1920

EATON, MISS MARY S., 8 Monument St., Concord, Mass.....1909
EATON, SCOTT HARRISON, Box 653, Lawrenceville, Ill.....1912
EATON, WARREN FRANCIS, Weston, Mass.....1921
EDSON, JOHN M., Marietta Road, Bellingham, Wash.....1886
EDSON, WM. L. G., 54 Fairview Ave., Rochester, N. Y.....1916
EDWARDS, J. HOWARD, 1664 Beacon St., Brookline, Mass.....1922
EHINGER, DR. CLYDE E., Chico, Kitsap Co., Wash.....1904
EIFRIG, PROF. C. W. GUSTAVE, 504 Monroe Ave., River Forest, Ill....1901
EIGENBROD, ALBERT E., 2736 Iberville St., New Orleans, La.....1922
EIMBECK, DR. AUGUST F., New Haven, Mo.....1906
EKBLAW, WALTER ELMER, 711 W. Nevada St., Urbana, Ill.....1911
ELIOT, WILLARD AYRES, 1011 Thurman St., Portland, Ore.....1918
ELLIOTT, MRS. JANE SHIELDS, 2900 Q. St., N. W., Washington, D. C..1921
EMERSON, W. OTTO, Route 1, Box 30, Hayward, Calif.....1916
EMILIO, S. GILBERT, 156 Hobart St., Danvers, Mass.....1922
EMLEN, ARTHUR COPE, "Awbury," Germantown, Philadelphia, Pa...1921
ENO, HENRY LANE, Princeton, N. J.....1918
ERICHSEN, W. J., 2311 Barnard St., Savannah, Ga.....1919
ESTERLY, DR. CALVIN O., Occidental College, Los Angeles, Calif.....1921
EVANS, DR. EVAN M., 550 Park Ave., New York, N. Y.....1916
EVANS, WILLIAM B., Moorestown, N. J.....1897
EVANS, WILLIAM V., 410 East Geyser St., Livingston, Mont.....1921
EYER, GEO. A., Short Hills, N. J.....1918
FAGAN, CHAS. L., Rt. 2, Box 58, Rahway, N. J.....1922
FAIRMAN, MISS MARIAN, 4744 Kenwood Ave., Chicago, Ill.....1920
FARGO, WILLIAM G., 506 Union St., Jackson, Mich.....1923
FARLEY, FRANK L., Camrose, Alberta.....1920
FARLEY, JACK, 46 S. Broadway, White Plains, N. Y.....1922
FAXON, ALLAN HART, 7 Edwards St., Southbridge, Mass.....1916
FAY, S. PRESCOTT, 2 Otis Place, Boston, Mass.....1907
FELGER, ALVA HOWARD, North Side High School, Denver, Colo.....1898
FELL, MISS EMMA TREGO, Holicong, Bucks Co., Pa.....1903
FELT, GEO. R., 71 Main St., Peabody, Mass.....1922
FERGUSON, ALFRED L., Greenwich, Conn.....1920
FERGUSON, HARRY L., 247 Park Ave., New York, N. Y.....1920
FERRES, MRS. WALTER D., 78 Sunset Ave., Ridgewood, N. J.....1921
FIELD, DR. GEORGE W., Sharon, Mass.....1910
FIELD, WM. L. W., Milton Acad., Milton, Mass.....1920
FISHER, MISS ELIZABETH WILSON, Ambler P. O., Brier Hill, Pa.....1896
FISHER, DR. G. CLYDE, American Mus. Nat. Hist., New York, N. Y..1908
FITCH, CONOVER, Cohasset, Mass.....1922
FITZPATRICK, WM. J., c/o Brown, Durrell Co., 104 Kingston St., Boston, Mass.....1920
FLEISHER, EDWARD, 1068 Park Place, Brooklyn, N. Y.....1916
FLETCHER, L. B., 54 Cotswold Rd., Brookline, Mass.....1921
FLETCHER, MRS. MARY E., Proctorsville, Vt.....1898

FLOYD, CHAS. BENTON, 454 Wolcott St., Auburndale, Mass.....1916
FLOYD, J. L., 508 New Harter Bank Bldg., Canton, Ohio.....1921
FOLSOM, MISS IDA M., Normal School, Presque Isle, Me.....1920
FOGG, DR. ADA O., Peak Island Sta., Portland, Maine.....1923
FOOT, DR. NATHAN CHANDLER, 1 Interwood Place, Clifton, Cincinnati, Ohio.....1916
FORAN, PHILIP FULFORD, 147 Wilbrod St., Ottawa, Ontario, Can....1921
FORBES, RALPH E., 328 Adams St., Milton, Mass.....1917
FORD, EDWARD R., Periodical Publishing Co., Grand Rapids, Mich...1920
FORD, MISS LOUISE PETIGRU, "The Heights," Aiken, S. C.....1919
FORTNER, PROF. HARRY C., 89 N. Prospect St., Burlington, Vt.....1920
*FOSTER, FRANCIS A., Edgartown, Mass.....1918
*FOSTER, FRANK B., P. O. Box 87, Haverford, Pa.....1916
FOSTER, DR. G. S., 967 Elm St., Manchester, N. H.....1921
FOTHERGILL, MISS E. R., 208 S. Whitney St., Hartford, Conn.....1920
FOWLER, FREDERICK HALL, 221 Kingsley Ave., Palo Alto, Calif.....1892
FOWLER, HENRY W., Acad. Nat. Sciences, Philadelphia, Pa.....1898
FRASER, DONALD, Johnstown, N. Y.....1902
FREEMAN, MISS HARRIET E., 258 Mt. Vernon St., West Newton, Mass.1903
FREEMAN, THOS. E., 128 Pleasant St., Arlington, Mass.....1922
FRENCH, MRS. A. J., R. F. D. 1, Carlton, Oregon.....1921
FRENCH, DR. CHAS. E., 62 Holyrood Ave., Lowell, Mass.....1923
FRENCH, CHARLES H., 950 Washington St., Canton, Mass.....1904
FRENCH, MRS. CHAS. H., 950 Washington St., Canton, Mass.....1908
FRENCH, DANIEL C., Glendale, Berkshire Co., Mass.....1922
FRENCH, MRS. MENA V., Box 171, Wayland, Mass.....1923
FREY, MRS. EDITH K., 814 3rd St., Jackson, Michigan.....1923
FRIEDMANN, RALPH, 32 Garden Place, Brooklyn, N. Y.....1921
FRIEDMANN, DR. HERBERT, 32 Garden Place, Brooklyn, N. Y.....1921
FROST, ALLEN, c/o Trussell Mfg. Co., Poughkeepsie, N. Y.....1919
FRY, REV. HENRY J., 88 27th St., Elmhurst, L. I., N. Y,.....1916
*FUGUET, HOWARD, 560 Bullitt Bldg., Philadelphia, Pa.....1919
FULLER, MRS. ANNIE L., Hancock, N. H.....1922
FULLER, ARTHUR B., 2717 Euclid Ave., Cleveland, Ohio.....1922
FULLER, HENRY C., 1348 Euclid St., Washington, D. C.....1916
FULLER, MRS. T. OTIS, 1137 Great Plain Ave., Needham, Mass.....1909
FULTON, HARRY L., 3903 W. 65th St., Chicago, Ill.....1922
GALVIN, E. R., 5056 DuPont Bldg., Wilmington, Del.....1921
GANIER, ALBERT F., 2507 Ashwood Ave. West, Nashville, Tenn.....1917
GARDINER, CHARLES BARNES, 175 W. Main St., Norwalk, Ohio.....1903
GARDNER, ASTON COLEBROOK, "Little Tangley," Ember Lane, Esher, Surrey, England.....1919
GARDNER, MRS. E. P., 140 Gibson St., Canandaigua, N. Y.....1920
GARDNER, JAMES H., 121 East 6th St., Tulsa, Okla.....1919
GARDNER, MRS. W. H., Bucksport, Me.....1920
GARST, DR. JULIUS, 29 Oread St., Worcester, Mass.....1916

GAUDETTE MISS MARIE E., Park Museum, Providence, R. I.....1921
GEIST, R. M., 811 Euclaire Ave., Bexley, Columbus, Ohio.....1923
GERTH, WALTER G., Box 319, Wolsey, S. Dak.....1918
GIANINI, CHAS. A., Poland, N. Y.....1911
GIFFORD, DR. HAROLD, 420 S. 36th St., Omaha, Nebr.....1922
GIFFORD, PAUL C., 73 Whittier Ave., Olneyville, R. I.....1921
GIGNOUX, CLAUDE, 73 Tunnel Road, Berkeley, Calif.....1921
GILBERT, MRS. F. M., Walpole, N. H.....1919
GILES, ROSCOE I., 82 Newton St., Marlborough, Mass.....1921
GILLESPIE, JOHN A., 313 Sharp Ave., Glenolden, Pa.....1923
GILLIAM, ROBERT A., 901 Cedar Hill Ave., Sta. A., Dallas, Texas....1920
GILLIN, JAMES R., Ambler, Pa.....1921
GILLIS, FRANK, Anoka, Minn.....1922
GILMAN, M. FRENCH, Banning, Calif.....1907
GLADDING, MRS. JOHN R., Thompson, Conn.....1912
GLASSFORD, S. ROBERT, 63 Highland Ave., Ridgewood, N. J.....1921
GLEASON, MRS. C. H., 700 Madison Ave., S. E., Grand Rapids, Mich..1917
GLENN, DONALD, 1250 Liberty St., Franklin, Pa.....1923
GLOYD, HOWARD K., Agr. College, Manhattan, Kansas.....1920
GOELITZ, WALTER A., 170 Nunda Boulevard, Rochester, N. Y.....1916
GOLSAN, LEWIS S., Box 97, Prattville, Ala.....1912
GOODE, MRS. F. B., Sharon, Mass.....1918
GOODRICH, MISS JULIET T., State Line, Vilas County, Wis.....1904
GORDON, FRED H., 100 Elwood Bldg., Rochester, N. Y.....1923
GORDON, HARRY E., 307 Laburnum Cres., Rochester, N. Y.....1911
GORDON, ROBERT B., 2281 Indianola Ave., Columbus, Ohio.....1923
GORE, JOHN K., 69 High St., Orange, N. J.....1921
GORMLEY, A. LIGUORI, 79 John St. N., Arnprior, Ont.....1918
GORST, CHARLES C., 28 Beauford R'd, Boston, 30, Mass.....1916
GOSS, JESSE B., 19 High St., Boston, Mass.....1922
GOULD, JOSEPH E., 320 Springfield Ave., Campostella Heights, Norfolk, Va.....1889
GOWANS, MISS ETHEL, Normal College, Kent, Ohio.....1921
GRANGE, WALLACE B., Ladysmith, Wis.....1920
GRANGER, WALTER W., Amer. Mus. Nat. Hist., New York, N. Y....1891
GRANT, DR. ADELE L., Dept. Botany, Cornell Univ., Ithaca, N. Y...1919
GRANT, E. O., Box 61, Patten, Maine.....1922
GRANT, WM. W., 816 S. Main St., Geneva, N. Y.....1910
GRASETT, F. G., 535 Green Bay Road, Glencoe, Ill.....1923
GRAVES, MRS. CHARLES B., 4 Mercer St., New London, Conn.....1905
GRAY, A. E., 216–18 First National Bank Bldg., Albuquerque, N. M..1923
GRAY, GEORGE M., Box 89, Woods Hole, Mass.....1916
GRAY, GEORGE W., Greenvale, Poughkeepsie, N Y.....1920
GREEN, HORACE OAKES, 221 North Ave., Wakefield, Mass.....1917
*GREEN, MORRIS MILLER, 39 Wyoming Ave., Ardmore, Pa.....1921
GREENE, EARLE R., 108 Orme Circle, Atlanta, Ga.....1921

GREENLAW, JOS. M., 28 Budleigh St., Beverly, Mass.....1920
GREENOUGH, HENRY VOSE, 39 Worthington Road, Brookline, Mass..1901
GREGORY, REV. C. E., Box 215, Morganton, N. C.....1922
GREGORY, STEPHEN S., JR., 345 Barry Ave., Chicago, Ill.....1916
GRIFFEE, WILLET E., Corvallis, Ore.....1919
GRIFFIN, BERTRAM S., Box 17, West Newbury, Mass.....1917
GRIM, WILLIAM H., Hamburg, Pa.....1921
GROSVENOR, MRS. FRANK, 320 E. Capitol St., Washington, D. C....1920
GUNTHORP, PROF. HORACE, 2107 E. 55th St., Seattle, Wash.....1919
HABERYAN, H. D., Box 32, Farmerville, La.....1921
HADELER, E. W., 520 So. State St., Painesville, Lake Co., Ohio.....1920
HADLEY, ALDEN H., Monrovia, Ind.....1906
HAGAR, J. A., Marshfield Hills, Mass.....1914
HAILE, H. PENNINGTON, 28 Edwards St., Springfield, Mass.....1919
HALL, E. RAYMOND, Mus. Vert. Zool., Univ. of Cal., Berkeley, Calif..1922
HALL F. S., State Museum, Univ. Washington, Seattle, Wash.....1923
HALLINAN, THOMAS, 212 Madison Ave., Paterson, N. J.....1919
HALLINEN, JOSEPH E., Cooperton, Okla.....1919
HANDLEY, CHAS. O., 30 East Washington St., Lexington, Va.....1916
HANDSAKER, RALPH, Colo, Iowa.....1922
HANKINSON, THOS. L., 96 Oakwood Ave., Ypsilanti, Mich.....1897
HANNA, DR. G. DALLAS, California Acad. Sci., San Francisco, Calif..1919
HANNA, WILSON CREAL, 141 East F. St., Colton, Calif.....1919
HARDING, RICHARD B., 94 Westbourne Terrace, Brookline, Mass....1922
HARDON, MRS. HENRY W., Wilton, Conn.....1905
HARING, MRS. INEZ M., 1774 Delmont Ave., East Cleveland, Ohio..1921
HARKIN, HON. JAMES B., Commr. Canadian Nat. Parks, Ottawa, Can.1921
HARRINGTON, MRS. A. B., Lincoln, Mass.....1919
HARRINGTON, DR. PAUL, 813 Bathurst St., Toronto, Ont.....1922
HARRINGTON, RALPH M., 84 Long Ave., Hamburg, N. Y.....1915
*HARRISON, GEO. L., JR., 400 Chestnut St., Philadelphia, Pa.....1919
HARROLD, C. G., 177 Smith St., Winnipeg, Canada.....1923
HART, CECIL, Rt. 6, Box 432, Los Angeles, Calif.....1921
HARTLEY, GEO. INNES, Southampton, L. I., N. Y.....1919
HARVEY, JOHN L., 3 Moody St., Waltham, Mass.....1916
HASBROUCK, HENRY C., 929 West End Ave., New York, N. Y.....1920
HASKELL, MISS SADIA, 1236 11th St., N. W., Washington, D. C.....1916
HASTINGS, WALTER E., Box 1, South Lyon, Mich.....1921
HATHAWAY, ALTON HASTINGS, 25 Oakland St., Lexington, Mass.....1921
HATHAWAY, MRS. E. L., Spring St., Rt. 1, W. Bridgewater, Mass.....1920
HATHAWAY, HARRY S., Wellington St., South Auburn, R. I.....1897
HAULTAIN, C. F., Port Hope, Ontario.....1923
HAVEMEYER, H. O., Mahwah, N. J.....1893
HAVEMEYER, H. O., JR., Mahwah, N. J.....1919
HAVEN, HERBERT, M. W., 500 Forest Ave., Portland, Me.....1920
HAWES, DR. EDWARD E., Hyannis, Mass.....1920

HAWK, JOHN L., 5843 Plymouth Ave., St. Louis, Mo.....1920
HAWLEY, MRS. ELIZABETH A., 74 Edward Ave., Pittsfield, Mass.....1922
HEDGES, CHAS. F., 1505 Pearl St., Miles City, Mont.....1919
HEGEMAN, MRS. CHAS. S., 39 South Fullerton Ave., Montclair, N. J..1923
*HELME, ARTHUR H., Miller Place, N. Y.....1888
HELMUTH, WM. TODD, 3RD, 182 W. 58th St., New York, N. Y.....1923
HEMENWAY, AUGUSTUS, Tavern Club, Bolyston Pl., Boston, Mass...1920
HEMPEL, MISS KATHLEEN, El Kader, Iowa.....1919
HEMPHILL, ASHTON ERASTUS, Holyoke, Mass.....1919
HENDERSON, JUNIUS, 627 Pine St., Boulder, Colo.....1903
HENDERSON, WALTER C., 4727 13th St., N. W., Washington, D. C...1917
HENDRICKSON, W. F., 276 Hillside Ave., Jamaica, N. Y.....1885
HERMAN, THEODORE L., 273 Neal Dow Ave., New Brighton, N. Y...1916
HERMAN, DR. WILLIAM C., 19 West 7th St., Cincinnati, Ohio.....1921
*HERRICK, HAROLD, 123 William St., New York, N. Y.....1905
HERRICK, NEWBOLD L., 60 Wall St., New York, N. Y.....1913
HERRICK, N. LAWRENCE, Cedarhurst, N. Y.....1917
HERRICK, MRS. W. H., Topsfield, Mass.....1922
HESTER, MRS. FRANCIS O., 6111 Greenwood Ave., Chicago, Ill.....1922
HIGBEE, HARRY G., Moose Hill Bird Sanctuary, Sharon, Mass.....1922
HILDRETH, MISS ELLEN, 6 Linnaean St., Cambridge, Mass.....1922
HILL, MRS. THOMAS R., Box 491, Chautauqua, N. Y.....1903
HIMMEL, WALTER J., Old Science Bldg., Iowa City, Iowa.....1920
HINCKLEY, GEO. LYMAN, Redwood Library, Newport, R. I.....1912
HINE, ASHLEY, 8131 Euclid Ave., Chicago, Ill.....1922
HINE, PROF. JAMES STEWART, Ohio State Univ., Columbus, Ohio....1899
HITCHCOCK, FRANK H., Metropolitan Club, 1 East 60th St., New York, N. Y.....1921
HIX, GEORGE E., 337 72nd St., Brooklyn, N. Y.....1904
HOLDEN, CAPT. OLIVER F., P. O. Box 336, Cleveland, Ohio.....1923
HOLLAND, HAROLD MAY, Galesburg, Ill.....1910
HOLLAND, R. P., 2273 Woolworth Bldg., New York, N. Y.....1920
HOLLAND, DR. WILLIAM J., Carnegie Museum, Pittsburgh, Pa.....1899
HOLLISTER, G. B., 4 E. 5th St., Corning, N. Y.....1919
HOLLISTER, WARREN D., Delavan, Wisc.....1901
HOLMAN, JOHN P., Southport, Conn.....1922
HOLMAN, RALPH H., 15 Whiting Road, Wellesley Hills, Mass.....1907
HOLT, ERNEST G., 312 Bell Bldg., Montgomery, Ala.....1911
HONYWILL, ALBERT W., JR., 2947 Collingwood St., Detroit, Mich...1907
HOPKINS, GEORGE I., 841 Beech St., Manchester, N. H.....1922
HORNING, DR. J. E., Luscar, Alberta, Can.....1922
HORSEY, RICHARD E., Highland P'k, Reservoir Ave., Rochester, N. Y.1919
HORSFALL, ROBERT BRUCE, R. F. D. 6, Box 80, Portland, Ore.....1905
HOTCHKISS, NEIL, Rt. 2, Marcellus, N. Y.....1919
HOUGHTON, CLARENCE, 533 Washington Ave., Albany, N. Y.....1920
HOWE, CLIFTON D., Univ. of Toronto, Toronto, Ontario.....1921

HOWE, MRS. E. L., Princeton, N. J.....1921
HOWE, MISS INEZ ADDIE, Fairbanks Mus. Nat. Sci., St. Johnsbury, Vt.1921
HOWLAND, R. H., 164 Wildwood Ave., Upper Montclair, N. J.....1903
HUBBARD, C. ANDRESEN, Pacific University, Forest Grove, Ore.....1916
HUBBARD, MRS. FRANK D., 81 Barnett St., New Haven, Conn.....1923
HUBBARD, PROF. MARIAN E., 19 Appleby Road, Wellesley, 81, Mass..1916
HUDSON, MRS. L. K., Simeon, Cherry Co., Nebr.....1922
HUEY, L. M., Nat. Hist. Mus., Balboa Park, San Diego, Calif.....1920
HUGHES, GEO. T., Box 153, Plainfield, N. J.....1916
HUGHES, DR. WILLIAM E., 3945 Chestnut St., Philadelphia, Pa.....1920
HUIDEKOPER, WALLIS, Wallis, Montana.....1923
HULL, MRS. BAKER, 1703 Bolton St., Baltimore, Md.....1921
HUNN, JOHN T. SHARPLESS, 1218 Prospect Ave., Plainfield, N. J.....1895
HUNT, CHRESWELL JOHN, 1929 S. Gunderson Ave., Berwyn, Ill.....1919
HUNT, MISS LUCY O., 185 Beacon St., Hartford, Conn.....1919
HUNT, RICHARD, Mus. Vert. Zool., Berkeley, Calif.....1918
HUNTER, MRS. KATHARINE U., Cupola Farm, West Claremont, N. H..1923
HURD, MISS FRANCES A., 43 West Ave., S. Norwalk, Conn.....1919
HUSHER, MRS. GERTRUDE H., 821 S. Hope St., Los Angeles, Calif...1918
HUTCHINSON, CONSTANT E., 2ND, The Phoenix Bank, Phoenix, N. Y..1923
HYDE, A. SIDNEY, 606 Penn. Ave., Urbana, Ill.....1921
HYDE, MRS. S. E., c/o Mayfield Stage, Boise, Idaho.....1918
HYSLOP, SAMUEL, 42 Bellevue St., Newton, Mass.....1919
IJAMS, H. P., R. F. D. 9, Knoxville, Tenn.....1922
INGERSOLL, ALBERT M., 908 F St., San Diego, Calif.....1885
ISHAM, CHAS. B., 909 Valley Rd., Upper Montclair, N. J.....1891
JACKSON, DR. HARTLEY H. T., Biological Survey, Washington, D. C..1910
JACKSON, JOHN W., Belchertown, Mass.....1920
JACKSON, RALPH W., R. D. 1, Box 70, Cambridge, Md.....1918
JACOT, E. C., 920 Ninth St., N. W., Canton, Ohio.....1923
JAMES, NORMAN, P. O. Drawer 2, Baltimore, Md.....1913
JAMES, THOMAS A., Augusta, Me.....1920
JANVRIN, DR. E. R. P., 515 Park Ave., New York, N. Y.....1919
JAY, WILLIAM, 12 Westview St., Mt. Airy, Philadelphia, Pa.....1921
JENKS, CHAS. W., Bedford, Mass.....1912
JENNINGS, DR. GEO. H., Jewett City, Conn.....1918
JENNINGS, PHILIP B., Wayside, Old Bennington, Vt.....1922
JENNINGS, RICHARD D., 129 Harrison St., East Orange, N. J.....1913
JENSEN, J. K., U. S. Indian School, Sante Fe, N. Mex.....1912
JEWETT, STANLEY G., 582 Bidwell St., Portland, Ore.....1906
JOHNSON, PROF. CHAS. E., College of Forestry, Syracuse, N. Y.....1919
JOHNSON, FRANK E., 16 Amackassin Terrace, Yonkers, N. Y.....1888
JOHNSON, MRS. GRACE P., Museum Nat. Hist., Springfield, Mass...1908
JOHNSON, WARD L., Lawrence School, Hewlett, Long Island, N. Y...1920
JOHNSTON, I. H., 818 Kanawha St., Charleston, W. Va.....1922
JOHNSTONE, WALTER B., Edgewood, Arrow Lake, B. C.....1920

JONES, CAROLINE SEYMOUR, Monument Ave., Bennington, Vt.....1922
JONES, JESSE L., 198 Dewey St., Edgewood, Pittsburgh, Pa.....1921
JONES, DR. LOMBARD CARTER, Falmouth, Mass.....1917
JONES, S. PAUL, 204 Frame Ave., Waukesha, Wis.....1920
JONES, WILLIAM F., Norway, Me.....1918
JORDAN, A. H. B., Lowell, Wash.....1888
JOY, ERNEST, Wood Island, Grand Manan, N. B.....1921
JUDD, E. T., Cando, N. Dakota.....1922
JUMP, MRS. EDWIN R., 97 Oakleigh Road, Newton, Mass.....1910
JUNG, CLARENCE S., 553 Prospect Ave., Milwaukee, Wis.....1921
KANE, MRS. SUSAN MARY, Mich. Club Bldg., Seattle, Wash.....1919
KEAYS, JAMES EDWARD, 328 St. George St., London, Ontario, Canada.1899
KEE, HUNTER, 36 9th Ave., Marlinton, W. Va.....1920
KELLOGG, RALPH T., Silver City, N. M.....1913
KELSO, DR. JOHN E. H., Edgewood, Lower Arrow Lake, B. C.....1915
KELTON, MRS. T. W., Charleston, Ark.....1923
KENDEIGH, S. CHARLES, 136 Woodland Ave., Oberlin, Ohio.....1923
KENNAN, RUTH R., 311 West Liberty, Medina, Ohio.....1922
KENNEDY, DR. HARRIS, Readville, 37, Mass.....1916
*KENNEDY, HARRY H., 105 Vine St., Reno, Nev.....1920
KENT DUANE E., 39 Moore Place, Rutland, Vt.....1913
KENT, EDWARD G., 9 Highland Ave., Madison N. J.....1919
KENT, EDWIN C., 19 Liberty St., New York, N. Y.....1907
KEPNER, MRS. C. M., R. F. D. 1, Randallstown, Md.....1922
KEYES, MRS. C. F., 2225 Lake of Isles Blvd., Minneapolis, Minn....1922
KIBBE, AUGUSTUS S., 1534 Grove St., Berkeley, Calif.....1923
*KIDDER, NATHANIEL T., Milton, Mass.....1906
KILGORE, WILLIAM, JR., Zool. Mus. Univ. Minn., Minneapolis, Minn..1906
KILGUS, J. FRANK, JR., 422 High St., Williamsport, Pa.....1922
KING, F. M., 111 E. Cedar St., Webster Groves, Mo.....1921
KING, LEROY, 27 E. 83rd St., New York, N. Y.....1901
KIRKHAM, MRS. JAMES W., 275 Maple St., Springfield, Mass.....1904
*KIRKHAM, STANTON D., 152 Howell St., Canandaigua, N. Y.....1910
KIRKHAM, WM. B., 100 Mill St., Springfield, Mass.....1922
KIRKPATRICK, HARRY C., 1166 Water St., Meadville, Pa.....1921
KIRKWOOD, FRANK C., R. F. D. 3, Monkton, Md.....1892
*KIRN, ALBERT J. B., R. F. D. 4, Solomon, Kan.....1918
KITCHIN, E. A., 4014 N. 35th St., Tacoma, Wash.....1923
KITTREDGE, JOSEPH, JR., Lake States Forest Exp. Sta. Univ. Farm,
St. Paul, Minn.....1910
KLOSEMAN, MISS J. E., Beal Hall, 20 Charlesgate W., Boston, Mass...1909
KLOTZ, CHAS. D., Morristown School, Morristown, N. J.....1923
KNAEBEL, ERNEST, 3707 Morrison St., Chevy Chase, D. C.....1906
KNICKERBOCKER, CHAS. K., 1214 McCormick Bldg., Chicago, Ill....1922
KNOLHOFF, FERDINAND WILLIAM, Argyle Park, Babylon, L. I., N. Y..1890
KNOX, MRS. SADIE B., 75 Pochassic St., Westfield, Mass.....1922

KOBBE, FREDERICK W., 103 E. 86th St., New York, N. Y.....1921
KOPMAN, HENRY H., Dept. Conservation, 207 N. O. Court Bldg., New Orleans, La.....1921
KRETZMANN, DR. P. E., 3705 Texas Ave., St. Louis, Mo.....1913
KUBICHEK, W. F., Coe College, Cedar Rapids, Iowa.....1919
KUMLIEN, WENDELL F., 711 7th Ave., Brookings, S. D.....1923
KUSER, ANTHONY R., Bernardsville, N. J.....1908
KUSER, MRS. ANTHONY R., Bernardsville N. J.....1910
KUSER, JOHN DRYDEN, Bernardsville, N. J.....1910
KUTCHIN, DR. VICTOR, Green Lake, Wis.....1922
LABARTHE, JULES, 2727 Russell St., Berkeley, Calif.....1920
LADOW, STANLEY V., 65 W. 9th St., New York, N. Y.....1913
LAFRANCHISE, MISS MARY L. Y., 31 Sherbrooke Ave., Hull, Quebec, Canada.....1921
LAING, HAMILTON M., Comox, British Columbia, Canada.....1917
LAMB, CHAS. R., 8 Highland St., Cambridge, Mass.....1912
LANCASHIRE, MRS. JAMES HENRY, 7 East 75th St., New York, N. Y...1909
LANG, HERBERT, Amer. Mus. Nat. Hist., New York, N. Y.....1907
LANGDON, ROY M., Littleton, Colo.....1918
LANGELIER, GUS. A., Cap Rouge, Quebec, Canada.....1923
LANO, ALBERT, 120 N. Block St., Fayetteville, Ark.....(1889)1919
LARRABEE, PROF. AUSTIN P., Yankton College, Yankton, S. Dak...1918
LASTRETO, C. B., 260 California St., San Francisco, Calif.....1919
LATHAM, ROY, Orient, N. Y.....1916
LAUGHLIN, J. A., 318 E. Gordon St., Marshall Mo.....1919
LAURENT, PHILIP, 31 E. Mt. Airy Ave., Philadelphia, Pa.....1902
LAWRENCE, A. G., City Health Dept., Winnipeg, Man.....1920
LAWRENCE, ROBERT B., 411 Westmoreland Ave., Houston, Texas (1883)1923
LAWSON, RALPH, 88 Washington Sq. East, Salem, Mass.....1917
LAZEAR, J. M., 922 S. Negley Ave., Pittsburgh, Pa.....1922
LEACH, FRANK A., Diablo, Calif.....1921
LEARNED, MISS AGNES M., Wilkins St., Hudson, Mass.....1920
LEATHERMAN, MRS. L. L., 2310 Emerson Ave. S., Minneapolis, Minn..1922
LEE, MRS. L. W., El Cajon, San Diego Co., Calif.....1920
LEEMING, T. L., 94th St. and 8th Ave., Brooklyn, N. Y.....1922
LEFFINGWELL, DANA J., McGraw Hall, Ithaca, N. Y.....1919
LEISTER, CLAUDE W., 7 Rosemont Ave., Saranac Lake, N. Y.....1916
LEOPOLD, NATHAN F., JR., 4754 Greenwood Ave., Chicago, Ill.....1916
LERMOND, N. W., Thomaston, Me.....1921
*LEVEY, MRS. WILLIAM M., 58 Davis Ave., Brookline, Mass.....1915
LEVIN, BENJAMIN SZOLD, 2104 Chelsea Terrace, Walbrook, Baltimore, Md.....1922
LEWIS, GEORGE P., 4559 Forrestville Ave., Chicago, Ill.....1920
LEWIS, HARRISON F., Can. Nat. Parks, Ottawa, Canada.....1912
LEWIS, MRS. HERMAN E., 180 Grove St., Haverhill, Mass.....1912

LEWY, DR. ALFRED, 6016 Stony Island Ave., Chicago, Ill.....1922
LIBBEY, ROBERT M., 520 New York Ave., N. W., Washington, D. C...1920
LIEBOLD, ERNEST G., 589 Boston Blv'd E., Detroit, Mich.....1918
LIGON, J. STOKLEY, Box 131, Albuquerque, New Mexico.....1912
LINCOLN, DR. ARTHUR T., Dennysville, Maine.....1923
LINGS, GEO. H., The Grange, Cheadle, Cheshire, England.....1913
LINK, HENRY A., P. O. Box 76, Waterloo, Ind.....1920
LINSDALE, JEAN, 1827 Barker Ave., Lawrence, Kansas.....1922
LITTLE, MRS. EFFIE G., R. F. D. 1, Lowell, Indiana.....1922
LITTLE, LESLIE T., Waltham Public Library, Waltham, Mass.....1922
LITTLE, LUTHER, 1403 Garfield Ave., So. Pasadena, Calif.....1913
LLOYD, HOYES, 406 Queen St., Ottawa, Canada.....1916
LOBDELL, PROF. R. M., Exp. Sta., A. & M. College, Miss.....1922
LOCKE, DR. EDWIN A., 311 Beacon St., Boston, Mass.....1920
LOCKWOOD, DEAN P., Haverford, Pa.....1921
LODGE, FRED S., 423 S. Stone Ave., La Grange, Ill.....1922
LOMAX, DR. CLAUDE, Holland, Indiana.....1921
LONG, CHAS. IRVING, 130 5th Ave., Roselle, N. J.....1918
LONG, HARRY V., 260 Clarendon St., Boston, Mass.....1920
LONGSTREET, ROBERT JAMES, Daytona Beach, Florida.....1923
LORD, FREDERICK P., 39 College St., Hanover, N. Y.....1922
LORD, J. ANDERSON, 13 Ash St., Danvers, Mass.....1919
LORING, J. ALDEN, Owego, N. Y.....1917
LOTHROP, DR. OLIVER A., 101 Beacon St., Boston, Mass.....1920
LOVELL, H. B., 238 Maine St., Brunswick, Maine.....1923
LOW, DANIEL STORY, D. W. House, Amherst College, Amherst, Mass..1922
LOW, ETHELBERT I., 30 Broad St., New York, N. Y.....1907
LOW, W. J., 16 Highland Ave., Montreal, Quebec.....1923
LUCE, MRS. FRANCIS P., Box 216, Vineyard Haven, Mass.....1912
LUCE, MATTHEW, Cohasset, Mass.....1920
LUM, EDWARD H., Chatham, N. J.....1904
LUNN, MISS LULU M., 724 Villa St., Racine, Wisc.....1920
LUNN, MISS MARGARET A., 1496 N. High St., Columbus, Ohio.....1919
LYMAN, STORRS H., P. O. Box 473, Dayton, Wash.....1923
LYNCH, JOSEPH, 400 Washington St., Perth Amboy, N. J.....1920
LYON, DR. MARCUS W., JR., 214 La Porte Ave., South Bend, Ind.....1922
LYON, WILLIAM I., 124 Washington St., Waukegan, Ill.....1921
MACCARTY, MRS. W. C., 820 Third St., S. W., Rochester, Minn.....1922
MACCOY, CLINTON V., 1213 Beacon St., Brookline, Mass.....1920
MACKAYE, JAMES, 160 Elm St., N. Cambridge, Mass.....1921
MACLOGHLIN, MRS. F. E., 43 Inglewood Drive, Hamilton, Ont., Canada.....1923
MACREYNOLDS, GEORGE, 76 E. State St., Doylestown, Pa.....1917
MACWILLIAMS, JAMES D., 96 Blair Hall, Princeton, N. J.....1922
MACKINTOSH, RICHARD B., 131 High St., Danvers, Mass.....1919
MACLAY, MARK W., JR., 107 E. 81st St., New York, N. Y.....1905

MACOMBER, A. G., Grove St., Lexington, Mass.....1923
MADDOCK, MISS EMELINE, Monte Vista, Philadelphia, Pa.....1897
MADISON, HAROLD LESTER, 2289 Grand View Ave., Cleveland Heights, Ohio 1912
MAGEE, M. J., 603 South St., Sault Ste. Marie, Mich.....1919
MAHER, J. E., 323 Pacific Ave., Jersey City, N. J.....1902
MARBLE, RICHARD M., Woodstock, Vt.....1907
MARBURGER, CLIFFORD, Denver, Pa.....1923
MARCOTTE, REV. LEON, St. Charles Seminary, Sherbrooke, Quebec, Canada.....1921
MARKS, EDWARD SIDNEY, 655 Kearney Ave., Arlington, N. J.....1915
MARRS, MRS. KINGSMILL, 9 Commonwealth Ave., Boston, Mass.....1903
MARSH, R. K., 1660 Holly St., Denver, Colo.....1922
MARSHALL, ALFRED, Montrose, Baldwin Co., Ala.....1916
*MARSHALL, MRS. ELLA M. O., New Salem, Mass.....1912
MARTIN, FRED I., R't 1, Box 58, Manchester, N. H.....1921
MARTIN, JOHN C., 909 State St., Owosso, Mich.....1921
MATHEWS, F. SCHUYLER, 17 Frost St., Cambridge, Mass.....1917
MATHEWS, FRANK P., 31 Blair Hall, Princeton, N. J.....1923
MATHIESON, OLAF, 285 Saint John's Place, Brooklyn, N. Y.....1922
MAY, FRANKLIN H., 730 Livingston Ave., Syracuse, N. Y.....1920
MAY, DR. JOHN B., Cohasset, Mass.....1922
MAYFIELD, DR. GEORGE R., Kissam Hall, Nashville, Tenn.....1917
MAYNARD, CHAS. J., 457 Crafts St., W. Newton, Mass.....1921
MAYNARD, DR. HERBERT E., 178 Commonwealth Ave., Boston, Mass.....1921
MCCABE, T. T., Barkerville, B. C., Can.....1920
MCCALL, W. W., Haverford, Pa.....1921
MCCANN, HORACE D., Valley Road, Paoli, Pa.....1923
MCCLINTOCK, NORMAN, 504 Amberson Ave., Pittsburgh, Pa.....1900
MCCOOK, PHILIP J., 413 E. 57th St., New York, N. Y.....1895
MCCREA, WM. S., 721 Rush St., Chicago, Ill.....1922
MCDANIEL, GEO. H., 234 W. Pratt St., Eureka, Calif.....1923
MCGRAW, HARRY A., 1805 15th Ave., Altoona Pa.....1917
MCILHENNY, EDWARD AVERY, Avery Island, La.....1894
MCKEOUGH, DR. GEO. T., R't 1, Erie Manor, Blenheim, Ontario.....1921
MCLAIN, ROBERT BAIRD, Box 546, Wheeling, W. Va.....1893
MCLELLAN, MISS MARY E., 87 7th Ave., Apt. 3, San Francisco, Calif.....1920
MCMILLAN, MRS. GILBERT N., Delafield Ave., Riverdale on Hudson, New York, N. Y.....1902
MCMULLEN, T. E., 933 N. 5th St., Camden, N. J.....1920
MCNEIL, DR. CHAS. A., 1112 West 4th St., Sedalia, Mo.....1919
MCNEIL, GEORGE M., 306 Bryant Ave., Ithaca, N. Y.....1920
MCVICKAR, MISS ELIZABETH H., Miller Road, Morristown, N. J.....1923
MEAD, MRS. E. M., 234 Central Park West, New York, N. Y.....1904
MEAD, LYLE G., 807 N. Pine Ave., Chicago, Ill.....1921
MEANS, CHAS. J., c/o Dr. Gregg, Wellesley, Mass.....1912

MEANS, ROBERT W., 19 Pearl St., Boston, Mass.....1922
MEDSGER, OLIVER P., 9 Columbia Ave., Arlington, N. J.....1919
MEGREW, ALDEN F., 265 Clarendon St., Boston, Mass.....1923
MELLEN, DR. ELEANOR, 291 Lake Ave., Newton Highlands, Mass...1920
MENGEL, G. HENRY, 739 Madison Ave., Reading, Pa.....1913
MENNINGER, WM. C., Cornell Medical College, 477 First Ave., New York, N. Y.....1919
MERCUR, J. WATTS, JR., Wallingford, Pa.....1920
MERRIAM, HENRY F., 165 Orange Heights Ave., W. Orange, N. J....1905
MERRILL, D. E., Rogers, Ark.....1913
**MERRILL, HARRY, 316 State St., Bangor, Maine.....1883
MERRIMAN R. OWEN, 96 W. 2nd St., Hamilton, Ont.....1920
*MERSHON, W. B., Saginaw, Mich.....1905
METCALF, DR. F. P., Fukien Christian Univ., Foochow, China.....1917
METCALF, Z. P., State College Station, Raleigh, N. C.....1913
MEYER, MAJOR G. RALPH, Camp Eustis, Va.....1913
*MEYER, MISS HELOISE, Lenox, Mass.....1913
MIDDLETON, R. J., Jeffersonville, Pa.....1920
MILLER, MISS BERTHA S., Capstone Farm, R. 3, Kingston, N. Y....1915
MILLER, MISS CARRIE ELLA, 36 Cottage St., Lewiston, Me.....1918
MILLER, MRS. ELIZABETH C. T., 1010 Euclid Ave., Cleveland, O.....1911
MILLER, FREDERIC W., 935 S. Gaylord St., Denver, Colo.....1922
MILLER, MRS. H. C., 1110 Main Street Racine, Wis.....1922
MILLER, MISS JULIA, R't 3, Hornell, Steuben Co., N. Y.....1921
MILLER, MISS MARY MANN, 5928 Hayes Ave., Los Angeles, Calif...1921
MILLS, DR. R. WALTER, 6682 Oakland Ave., St. Louis, Mo.....1922
MILLS, WIER R., Pierson, Iowa.....1920
MINER, LEO D., 1836 Vernon St., N. W., Washington, D. C.....1913
MITCHELL, MISS CATHARINE ADAMS, Riverside, Ill.....1911
MITCHELL, H. HEDLEY, Provincial Mus., Regina, Sask.....1918
MITCHELL, MASON, U. S. Consul, Valetta, Malta.....1922
MITCHELL, DR. WALTON I., Paonia, Delta Co., Colo.....1893
MOFFETT, MISS CAROLINE T., C. W. Henry School, Germantown, Philadelphia, Pa.....1923
MOHR, CARL OTTO, Rapidan, Minn.....1922
MONK, H. C., Avoca Apts., Nashville, Tenn.....1921
MOODY, A. J., c/o Aetna Life Ins. Co., Hartford, Conn.....1918
MOORE, ARTHUR D., 712 Phoenix St., South Haven, Mich.....1922
MOORE ELIZABETH P., 26 Lime St., Boston, Mass.....1923
MORCOM, G. FREAN, 243 North Coronado St., Los Angeles, Calif....1886
MORE, R. L., 205 W. Wilbarger St., Vernon, Texas.....1921
MORGAN, BRENT M., 224 11th St., S. W., Washington, D. C.....1919
MORGAN, MRS. ELEANOR L., Hotel Sherwood, Baltimore, Md.....1922
MORLEY, ARTHUR, 26 Minerva St., Swampscott, Mass.....1922
MORRELL, ARCH HIRAM, 210 Maine Ave., Gardiner, Maine.....1923
*MORRIS, DR. LEWIS R., 60 W. 58th St., New York, N. Y.....1923

Morris, Miss Lucy N., 238 Claremont Ave., Montclair, N. J.....1920
Morrison, Alva, P. O. Box 2365, Boston, Mass.....1915
Morse, Albert P., Peabody Museum, Salem, Mass.....1922
Morse, Francis E., 23 Bradlee St., Dorchester 24, Mass.....1921
Morse, Frank E., 162 Boylston St., Boston, Mass.....1921
Morse, Geo. F., Jr., Forestry Dept., County Bldg., Chicago, Ill....1919
Morse, Geo. W., 318 East 9th St., Tulsa, Okla.....1922
Morse, Harry Gilman, Huron, Ohio.....1912
Morse, Miss M. E., 3513 Bloomington Ave., Minneapolis, Minn...1919
Morss, Chas. B., P. O. Box 26, Bradford, Mass.....1918
Moseley, Prof. Edwin Lincoln, Bowling Green, Ohio.....1918
Moses, Mrs. Edmund Quincey, 16 Fairview Ave., Tarrytown, N. Y..1919
Mosher, Franklin H., 17 Highland Ave., Melrose Highlands, Mass..1905
Moulton, Chas. E., 72 Maple St., Lynn, Mass.....1922
Moulton Herbert F., 12 School St., Ware, Mass.....1920
Mousley, Wm. Henry, Hatley, Quebec, Canada.....1915
Mueller, Walter J., 580 Beverly Road, Milwaukee, Wis.....1923
Munger, Mrs. Edith C., Hart, Michigan.....1923
Munro, J. A., 1060 St. David St., Oak Bay, Victoria, British Columbia1913
Munro, Mrs. Walter S., 40 N. Main St., So. Norwalk, Conn.....1920
Murie, O. J., 219 7th Ave. S., Moorhead, Minn.....1913
Murphy, Dr. Eugene Edmund, 432 Telfair St., Augusta, Ga.....1919
Murphy, Mrs. Grace E. B., 45 Oriole Ave., Bronxville, N. Y.....1919
Murray, Edgar A., 2703 Guoin St., Detroit, Mich.....1919
Murray, Frank F., Box 606, Titusville, Pa.....1922
Musselman, Guy N., 392 E. Main St., New Holland, Pa.....1921
Musselman, T. E., 124 S. 24th St., Quincy, Ill.....1922
Myers, Mrs. Harriet W., 311 N. Ave. 66, Los Angeles, Calif.....1906
Myers, Miss Lucy F., 64 Market St., Poughkeepsie, N. Y.....1898
Myers, Ord, 216th St. and 9th Ave., New York, N. Y.....1922
Naumburg, Walter W., 14 Wall St., New York, N. Y.....1923
Naumburg, Mrs. Walter W., Hotel St. Regis, New York, N. Y....1916
*Neely, James C., 135 High St., Brookline, Mass.....1919
Neff, Johnson, Marionville, Mo.....1919
Neilson, James A., Wheatland, Wyoming.....1923
Newberry, W. F., 233 Broadway, New York, N. Y.....1920
Newcomb, C. A., Jr., Rt. 3, Pontiac, Mich.....1920
Nice, Mrs. Margaret M., Norman, Okla.....1920
Nichols, L. Nelson, N. Y. Public Library, New York, N. Y.....1917
Nichols, Rodman A., 27 Broad St., Salem, Mass.....1919
Nicholson, Nevin G., 410 Elm St., Grove City, Pa.....1920
Nims, Mrs. Lucius, 17 Union St., Greenfield, Mass.....1913
Nininger, Prof. H. H., 759 E. Euclid St., McPherson, Kan.....1920
Noble, Eleanor G., 66 Sparks St., Cambridge, Mass.....1916
Nokes, Dr. I. D., 1120 Marsh-Strong Bldg., Los Angeles, Calif.....1915
Nolte, Rev. Felix, St. Benedict's College, Atchison, Kan.....1903

NORRIS, EDWARD, 301 W. Springfield Ave., Philadelphia, Pa.....1916
NORRIS, J. PARKER, JR., 2122 Pine St., Philadelphia, Pa.....1904
NOWELL, MISS MARY, 12 Linnaean St., Cambridge, Mass.....1922
NUGENT, JAMES R., 772 Broad St., Newark, N. J.....1920
*O'CONOR, JOHN CHRISTOPHER, 24 E. 33rd St., New York, N. Y.....1921
OGDEN, DAVID B., 23 Alton Place, Brookline, Mass.....1920
OGDEN, DR. HENRY VINING, 141 Wisconsin St., Milwaukee, Wis.....1897
OLDYS, HENRY, Silver Spring, Md.....1896
ORTEGA, JAMES L., R't 1, Box 37, Yountville, Calif.....1923
OSBORN, PROF. HENRY F., Am. Mus. Nat. Hist., New York, N. Y...1919
OSBORN, MARY E., 1141 Hinman Ave., Evanston, Ill.....1922
OSBORNE, ARTHUR A., 183 Lowell St., Peabody, Mass.....1912
OSLER, H. S., 1 Rosedale Road, Toronto, Ont.....1920
OSWALD, W. A., 301 Wilson Ave., Notre Dame de Grace, Montreal, Canada.....1922
OVER, WILLIAM H., 125 Harvard St. N., Vermillion, S. Dak.....1921
OVERTON, DR. FRANK, Patchogue, N. Y.....1909
*OWEN, MISS JULIETTE AMELIA, 306 N. 9th St., St. Joseph, Mo.....1897
PACKARD, WINTHROP, 1442 Washington St., Canton, Mass.....1917
PAGAN, FRANK, Central Ave., Wellsboro, Pa.....1923
PAINE, AUGUSTUS G., JR., 31 E. 69th St., New York, N. Y.....1886
PAINE, CHARLES JACKSON, Room 1400, 11 Beacon St., Boston, Mass...1917
PAINE, JOHN B., Weston, Mass.....1922
PAINTER, DAVID S., 840 Milwaukee St., Denver, Colo.....1923
PAINTER KENYON V., 3240 Fairmount Blv'd, Cleveland, Ohio.....1920
*PALMER, MISS E. D., 1741 S. Harvard Blv'd, Los Angeles, Calif....1918
PALMER, R. H., Instituto Geologico, City of Mexico, D. F., Mexico..1916
PALMER, DR. SAMUEL C., Swarthmore College, Swarthmore, Pa.....1899
PALMER, MRS. T. S., 1939 Biltmore St., N. W., Washington, D. C...1918
PANGBURN, CLIFFORD H., 299 Madison Ave., New York, N. Y.....1907
*PARKER, EDWARD LUDLOW, Nashawtuc Rd., Concord, Mass.....1916
PARKER, BARTOL, Framingham Centre, Mass.....1922
PARKER, HERBERT, So. Lancaster, Mass.....1920
PATCH, DR. EDITH M., College Road, Orono, Me.....1921
PATTEN, DR. STEPHEN K., 141 Milk St., Boston, Mass.....1920
PAUL, LUCIUS H., 436 Carter St., Rochester, N. Y.....1908
PAULSON, MARTIN C., R. F. D. 5, Nevada, Iowa.....1922
PEABODY, REV. P. B., Blue Rapids, Kan.....1903
PEASE, MISS FLORENCE M., Box 265, Conway, Mass.....1922
PELLEW, MISS M. J., Box 445, Aiken, S. C.....1919
PEMBER, KARL A., Woodstock, Vt.....1921
PEMBERTON, JOHN ROY, 1230 N. Vine St., Hollywood, Calif.....1918
*PENROSE, DR. CHAS. BINGHAM, 1720 Spruce St., Philadelphia, Pa....1919
PEPPER, DR. WM., Melrose Park, Philadelphia, Pa.....1911
PERCIVAL, MRS. D. C., 306 Commonwealth Ave., Boston, Mass.....1921
PERINE, KEBLE B., Box 589, Chapel Hill, N. C.....1917

PERKINS, DR. ANNE E., Gowanda Hospital, Helmuth, N. Y.....1917
PERKINS, ARTHUR W., P. O. Box 510, Farmington, Me.....1915
PERKINS, EARLE B., 134 Pine St., S. Portland, Me.....1922
PERKINS, EDW. H., Colby College, Waterville, Me.....1920
PERKINS, DR. GEORGE H., Univ. of Vt., Burlington, Vt.....1912
PERKINS, IRVING J., Rt. 5, Box 67, Oconomowoc, Wis.....1923
PERKINS, MISS MARY K., 726 Brice Ave., Lima, Ohio.....1923
PERKINS, SAMUEL E., 3RD, 203 City Trust Bldg., Indianapolis, Indiana 1923
PERKINS, MRS. W. L., 1603 Garland St., Flint, Mich.....1922
PERRY, GEO. L., 68 Thurston St., Winter Hill, Somerville, Mass.....1923
PERRY GEO. P., 310 Locust St., Sterling, Ill.....1922
PERRY, DR. HENRY JOSEPH, 19 Bay State Road, Boston, Mass.....1909
PETER, JULIUS C., Detroit Trust Co., Detroit, Mich.....1921
PETERS, ALBERT S., Donnybrook, N. Dakota.....1908
PETERS, JOS. G., JR. Box 22, North Truro, Mass.....1921
PETERSON, ALFRED, Box 211, Pipestone, Minn.....1920
PETTIT, HORACE, 28 Campbell Hall, Princeton, N. J.....1923
PETTY, ORVILLE A., Chapel St. & Sherman Ave., New Haven, Conn. 1919
PHELPS, FRANK M., 212 E. 4th St., Elyria, Ohio.....1912
PHELPS, MRS. J. W., Box 158, Northfield, Mass.....1899
*PHILIPP, PHILIP B., 220 Broadway, New York, N. Y.....1907
PHILLIPS, ALEXANDER H., 54 Hodge Road, Princeton, N. J.....1891
PHILLIPS, CHAS. LINCOLN, 5 West Weir St., Taunton, Mass.....1912
*PHILLIPS, JOHN M., 2227 Jane St., Pittsburgh, Pa.....1920
PIERCE, FRANKLIN K., Hotel Vendome, Boston, Mass.....1922
PIERCE, FRED J., Winthrop, Iowa.....1922
PIERCE, WRIGHT MCEWEN, Box 343, Claremont, Calif.....1918
PILKINGTON, H. GORDON, 26 Taylor St., Providence, R. I.....1922
PILSBURY, FRANK O., 1088 Main St., Walpole, Mass.....1917
PINCHOT, GIFFORD, Executive Mansion, Harrisburg, Pa.....1910
PINDAR, DR. L. OTLEY, Versailles, Kentucky.....1922
PIRNIE, MILES D., McGraw Hall, Ithaca, N. Y.....1919
PLATT, HON. EDMUND, 2339 Ashmead Pl., N. W., Washington, D. C...1917
POE, MISS MARGARETTA, Earl Court, St. Paul and Preston Sts., Baltimore, Md.....1899
POMEROY, F. E., 342 College St., Lewiston, Me.....1920
POOLE, EARL L., Public Museum, Reading, Pa.....1916
POPE, E. F., Box 113, El Reno, Okla.....1920
PORTER, EDGAR F., R. F. D. 2, Athol, Mass.....1922
PORTER, LOUIS H., Stamford, Conn.....1893
PORTER, WILLARD B., 4 Mason St., Salem, Mass.....1922
POST, WILLIAM S., 101 Park Ave., New York, N. Y.....1911
POTTER, JULIAN K., 563 Bailey St., Camden, N. J.....1912
POTTER, LAWRENCE B., Gower Ranch, East End, Sask.....1919
POTTER, L. HENRY, R. F. D. 2, West Rutland, Vt.....1922
POTTS, F. A., Ensenada, Porto Rico.....1922

Potts, Thomas C., East Erie Ave. & D St., Philadelphia, Pa.....1923
Pough, Richard H., 4 Lenox Place, St. Louis, Mo.....1922
Praeger, William E., Kalamazoo College, Kalamazoo, Mich.....1892
Pratt, Mrs. Alice B., 4 Pierce St., Middleboro, Mass.....1922
Pratt, Hon. Geo. D., Pratt Ins'te, 215 Ryerson St., Brooklyn, N. Y..1917
Pratt, Miss H. Steele, 245 W. Ridgeway Ave., Eagle Rock, Los Angeles Co., Calif.....1923
Prentiss, Rev. Wm. C., Plainfield, Conn.....1921
Prescott, Mrs. Clara R., 87 High St., Orange, N. J.....1921
Prescott, Mrs. S. C., 249 Tappan St., Brookline 46, Mass.....1922
Price, John Henry, Crown W. Ranch, Knowlton, Mont.....1906
Price, Ligon, Marlinton, W. Va.....1913
Priest, Geo. H., 33 North Ash St., Brockton, Mass.....1922
Prill, Dr. A. G., Scio, Oregon.....1921
Pritchard, Mrs. F. A., 203 N. Court St., Medina, Ohio.....1918
Proctor, George N., 35 Congress St., Boston, Mass.....1919
Purdie, Miss Evelyn, 49 Ware Hall, 383 Harvard St., Cambridge, Mass.....1921
Purdy, James B., R. F. D. 1, Plymouth, Mich.....1893
Purdy, William B., Milford, Oakland Co., Mich.....1921
Quarles, Emmet Augustus, 139 E. 7th St., Plainfield, N. J.....1918
Quillin, Roy W., 1025 Summit Ave., San Antonio, Tex.....1920
Quincy, Josiah H., 37 Stratford St., Boston 32, Mass.....1922
Racey, Kenneth, 3262 First Ave. W., Vancouver, B. C.....1921
Rainwater, Miss Harriett C., 582 W. Peachtree St., Atlanta, Ga..1923
Rand, Frank L., 1106 Arcade Bldg., St. Louis, Mo.....1922
Rankin, Dr. Geo. Samuel, Longford, St. George's, Bermuda.....1922
Rapp, F. W., Vicksburg, Mich.....1922
Ratliff, Hon. Walter S., R. R. B., Box 276, Richmond, Ind.....1918
Raven, Henry Cushier, c/o South Side Bank, Bayshore, N. Y.....1918
Raymond, Miss Bessie, 564 Diagonal Road, Akron, Ohio.....1920
Raymond, Mrs. Charles E., 21 Third St., Hinsdale, Ill.....1923
Raymond, O. M., 341 Cuyler St., Princeton, N. J.....1922
Rea, Dr. Paul M., 2717 Euclid Ave., Cleveland Ohio.....1912
Reagh, Dr. Arthur Lincoln, 39 Maple St., West Roxbury, Mass...1896
Reed, Mrs. Bessie, 308 E. 19th St., Lawrence, Kan.....1920
Reed, Miss Clara Everett, Brookfield, Mass.....1919
Reed, Montague, 2660 Park Avenue, Apt. 11, Montreal, Canada...1921
Reese, Mrs. Robt. M., 517 Cameron St., Alexandria, Va.....1920
Regar, H. Severn, 1400 De Kalb St., Norristown, Pa.....1916
Regar, J. Bertram, 900 Oak Lane Ave., Philadelphia, Pa.....1923
Rehn James A. G., Acad. Nat. Sciences, Logan Sq., Philadelphia, Pa..1901
Reid, Mrs. Bruce, Gulf Refinery, Port Arthur, Tex.....1918
Reid, Russell, 210 Thayer St., Bismarck, N. Dak.....1919
Reis, Jacob A., Jr., Edea, Cameroon, W. Africa.....1921
Rett, Egmont Z., Mus. Nat. Hist., Santa Barbara, Calif.....1917

RHOADS, CHARLES J., 1914 S. Rittenhouse Sq., Philadelphia Pa.....1895
RICE, JAMES HENRY, JR., Brick House Plantation, Wiggins, S. C....1910
RICE, WARD J., Roachdale, Ind.....1913
RICH, MISS NELLIE V., 55 Carmel St., New Haven, Conn.....1923
RICH, WALDO L., Box 221, Saratoga Springs, N. Y.....1921
RICHARDS, MISS HARRIET E., 36 Longwood Ave., Brookline, Mass...1900
RICHARDS, MISS RUTH, Clifton Sta., Fairfax Co., Va.....1921
RICHARDSON, FREDERICK L. W., JR., Charles River, Mass.....1921
RICHARDSON, JENNESS, 704 Delaware St., Minneapolis, Minn.....1920
RICHARDSON, W. D., 4215 Prairie Ave., Chicago, Ill.....1917
RICHARDSON, DR. WYMAN, 60 West Cedar St., Boston, Mass.....1920
RIDDICK, GEO. M., Box 1168, Houston, Tex.....1922
RIDGWAY, JOHN L., Mus. Hist., Sci. and Art, Los Angeles, Calif.....1890
RIES, DONALD T., 401 Thurston Ave., Ithaca, N. Y.....1920
RIIS, PAUL B., 301 Shaw St., Rockford, Ill.....1920
RIKER, CLARENCE B., 432 Scotland Road, South Orange, N. J.....1885
RISHEL, JOHN B., 101 Parkwood St., Williamsport, Pa.....1922
ROBB, WALLACE H., Cazenovia, N. Y.....1921
ROBBINS, CHARLES A., Onset, Mass.....1914
ROBBINS, REGINALD C., Hamilton, Mass.....1921
ROBBINS, MRS. REGINALD C., Hamilton, Mass.....1921
ROBERTS, MILES, 756 Kensington Ave., Plainfield, N. J.....1922
ROBERTS, WILLIAM ELY, 207 McKinley Ave., Lansdowne, Pa.....1902
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ROBERTSON, HOWARD, 157 S. Wilton Drive, Los Angeles, Calif.....1911
ROBERTSON, JOHN McB., Box 121, Buena Park, Orange Co., Calif...1920
ROBINSON, ANTHONY W., P. O. Box 426, Haverford, Pa.....1903
ROBINSON, FRANCIS B., Route 9, Owasco Road, Auburn, N. Y.....1923
ROBINSON, Prof. J. M., Box 264, Auburn, Ala.....1922
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ROBINSON, MISS MARY L., Central High School, Kansas City, Mo...1919
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ROGERS, MISS MABEL F., 11 Fourth Ave., Ottawa, Ontario, Canada..1921
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ROSE, GEORGE C., 41 Stenkey St., Albany, N. Y.....1920
ROSE, RALPH H., South Kortright, N. Y.....1921
ROSS, GEO. H., 23 West St., Rutland, Vt.....1904
ROSS, DR. LUCRETIUS H., 507 Main St., Bennington, Vt.....1912
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ROWAN, PROF. WILLIAM, Univ. of Alberta, Edmonton, Alta.....1920
RUGG, HAROLD GODDARD, Dartmouth College, Hanover, N. H.....1919
RUSSELL, JOHN W., 84 Joslin St. Providence, R. I.....1922
RUST, HENRY J., Coeur d'Alene, Idaho.....1918

SAGE, HENRY M., Menands Road, Albany, N. Y.....1885
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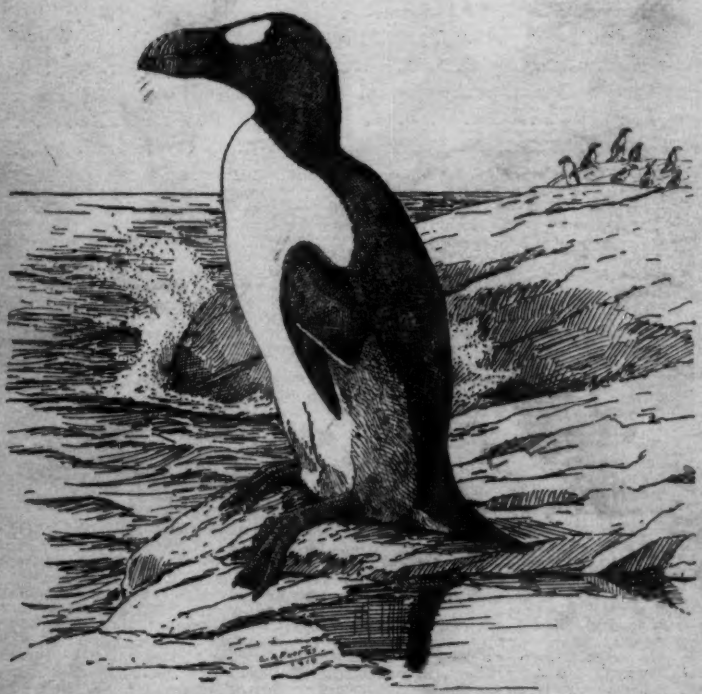

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1. SCREECH OWL AT NIGHT (FLASH-LIGHTED) WITH A SALAMANDER FOR ITS YOUNG.
2. THE SAME BIRD WITH HAWK MOTH.

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A CONTRIBUTION TO THE LIFE HISTORY AND ECONOMIC STATUS OF THE SCREECH OWL (OTUS ASIO).

BY A. A. ALLEN, PH.D.

Plates I–V.

DURING the past six years we have maintained at our home in Ithaca, N. Y., a bird sanctuary. It consists of about four acres of rather rough ground on a hillside facing the west. A rather deep ravine passes through the north side of the grounds and the whole area is scatteringly covered with pine, hemlock, maple, elm, ash, and basswood. Near the house the stream has been dammed to form a small waterfowl pond and about one half acre of the open land is used for enclosures for upland game birds. There are plenty of tangles and shrubbery for nesting places so that, without much further inducement, there has always been an abundance and a considerable variety of birds making it their home.

Each year we have maintained a map of the area upon which the location of the nest of each bird has been accurately charted so that we have come to have a rather personal interest in each pair of birds. The making of these maps and the histories of the different bird families is a long story which will be omitted at this time and it is mentioned only to give the setting for a pair of Screech Owls (*Otus asio*) which are the subject of this article. For it is impossible to make an intensive study of any bird without

involving its neighbors, especially when that bird happens to be an Owl.

A pair of Screech Owls appeared in the sanctuary first in 1921 when they made their nest in a hollow basswood about a hundred yards up the ravine from the house. They were rather quiet neighbors, so much so, in fact, that we did not suspect their nesting until the first young left the nest and perched in the hemlock close by. This year we were looking for them but they did not return to their former nest which was occupied by a pair of red squirrels. It was not until the first of May that we discovered the nest and then, to our surprise, found it in a Flicker box on a large pine by the pond. The box was about twenty feet from the ground but in plain sight of the house and the path which was followed each day in feeding the ducks. There was nothing about the box to indicate that it was in use, but the presence of the male bird in a hemlock close by for several days in succession led us to investigate and we found that the young birds were already nearly half grown. After that we watched the box more closely and, though the male bird sat each day in the same place, there was no sign of life in the box until just before dark when the head of the female appeared in the opening. For five or ten minutes she sat thus, her big eyes following the movements of the Phoebes that nested on the cliff at the opposite side of the pond. Occasionally she stretched her neck to watch a tardy Mallard duckling trying to guzzle a last worm out of the bank below her, before retiring to the protection of its mother's wing. Again she turned her head to follow the flight of a Robin across the ravine, but she never seemed to pay attention to any of us and, at almost the same minute (7:50) each evening, she pitched out of the box and glided silently up the ravine. During the last week in May, when the young had begun to develop juvenile feathers in place of their natal down, and when the sun began to beat rather warmly on the sides of the box, the female moved to the hemlock for the days, perching close against the trunk a few feet below her mate.

At about this time I found the remains of a Veery cached on a horizontal branch of a hemlock in the ravine. The next day it was gone but in another tree I found the remains of a Phoebe. Circumstantial evidence pointed toward the Screech Owls being

1. RAVINE SHOWING LOCATION OF OWL'S NESTING BOX ON PINE MARKED BY CROSS. THE YOUNG OWLS WERE LATER PLACED IN CAGE ON ROOF OF THE SHED IN BACKGROUND.
2. OBSERVATION STATION ON ROOF OF SHED. NOTE THE CAGE WITH YOUNG OWL TETHERED IN FRONT, THE LANTERN IN A BOX. CAMERA, FLASHLIGHT, ETC.

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the culprits although I had had no evidence previously of their destroying birds. Upon examining the nest in the box, however, I found a great many feathers and I recalled examining three or four nests of Screech Owls in previous years and always finding a quantity of feathers in the bottom of the nesting cavities. It is common parlance among economic ornithologists that Screech Owls destroy some birds during the nesting season when mice are difficult to secure, and published information bears this out. Just what the "some" means is not often explained, so I determined to find out, definitely, just what part this pair of Screech Owls were playing in maintaining "the balance of nature" in our bird sanctuary. Accordingly I lowered the nesting box, containing the young Owls, a little each night until it was on a level with the top of a blind erected at the foot of the nesting tree. Whether the old Owls relished the change or not, they continued to feed their young, even when a lighted lantern was added to the equipment.

In returning to the nest the parent birds always did so with a direct swoop, landing with the head inside the opening and clinging to the side of the box like a Woodpecker so that it made it difficult to see what food was being brought. We, therefore, removed the young birds, of which there were three, and tethered them to the top of the box or to a branch in the open where it was possible to see just what was being brought to them. On June 3, when they began to leave the nesting box of their own accord, we transferred them to a cage on the roof of a low building close by where they would be safe from marauding animals and yet where they could be conveniently watched. The cage, a modified "run" for a Pheasant hatching coop, was covered with one inch wire through which food could be passed to the young. For convenience in watching, the cage was at times closed with boards on all sides save one. At other times the young birds were tethered to a branch outside of the cage and in front of the lantern which was ever kept burning in a box. The Owls soon became accustomed to these changes and fed their young as though nothing had happened. Whenever my time permitted I entered the blind at eight P. M. and remained until ten or eleven. Upon two occasions I entered the blind at 2:30 A. M. and remained until daylight. Owing to my other duties, it was impossible for me to remain up all night

with the Owls and so Mr. George McNeill volunteered his services and for seven nights he relieved me in the blind at 10 P. M. and remained until daylight. His observations on the birds are incorporated in this paper, his remarks upon the mosquitoes and the chilliness of the small hours have been omitted for fear of discouraging other less enthusiastic young ornithologists from carrying on similar observations.

In addition to the direct observations made on the feeding birds, each morning I collected all feathers, bones, pellets or other remains that were to be found in or about the cage representing the previous night's revels.

Observations of this kind would be incomplete without photographs of the happenings and accordingly on many nights I focussed a camera upon the young birds and connected the shutter with an "imp flash gun" so that exposures of 1/300 of a second could be made during the feeding operations by either Mr. McNeill or myself. The accompanying photographs showing the Owl with the hawk moth and with the birds were secured by Mr. McNeill.

Method of feeding: From the outset it was obvious that both parent birds were engaged in caring for the young. In the dim light of the lantern it was impossible to tell them apart but the frequency with which the young were sometimes fed indicated that the parents shared about equally in feeding. They never both came together to feed but frequently when the flash light disturbed one bird before it had time to feed, the other would return with food and both would be near with food in their bills at the same time. The old birds were ordinarily silent in their hunting and feeding but the young birds, after they had been put in the cage, kept up a continuous humming during the night which lasted as long as they were hungry. If one of the young did not give this food call, the old birds paid no attention to him but fed the ones that called. The food was always brought in the bills of the old birds and placed directly into the mouths of the young. Large objects like birds or mice were often brought already partially torn or eaten or they were sometimes torn to pieces in front of the cage before being passed through the wire. Just as often, however, the entire bird was given to the young and they would fight among themselves for it. It was after one such tug-of-war that two of the

young attacked the third and picked most of his bones by morning.

An interesting observation incident to the method of feeding, and one that shows conspicuously in the photographs, was the way in which the old bird half-closed its eyes at the moment of feeding as though it were necessary, upon such close approach to the young, to put the dimmers on its head lights. At such times the upper eyelid was dropped, the lower eyelid remaining immovable and the pupil remaining distended in its characteristic nocturnal form.

Nature of the food: As before stated the nature of the food brought to the young was determined in two ways: by direct observation, and by gathering the remains left about the cage each morning. The debris in the nest was likewise examined and all feathers, bones or other identifiable material was recorded.

Perhaps no better idea of the food of the young can be given than by enumerating the various articles gathered each morning from June 4 to July 18, the period during which the young were in the cage until they were finally deserted.

MEMORANDUM OF FOOD MATERIALS GATHERED IN OR ABOUT THE CAGE IN WHICH THE YOUNG SCREECH OWLS WERE CONFINED.

June 4: Red-backed salamander, dusky salamander, hawk moth, crayfish, feathers of female Scarlet Tanager.

June 5: Dusky salamander, crayfish, fish bones and scales (probably alewife), dragonfly, feathers of Phoebe.

June 6: Dusky salamander, noctuid moths, green caterpillar, cockroach, feathers of Song Sparrow and House Sparrow. One small pellet, the first.

June 7: Red-backed salamander, noctuid moths, June beetle, crayfish, large spider, feathers of female Redstart and Catbird, two pellets.

June 8: Dusky salamander, crayfish, noctuid moth, feathers of Swamp Sparrow.

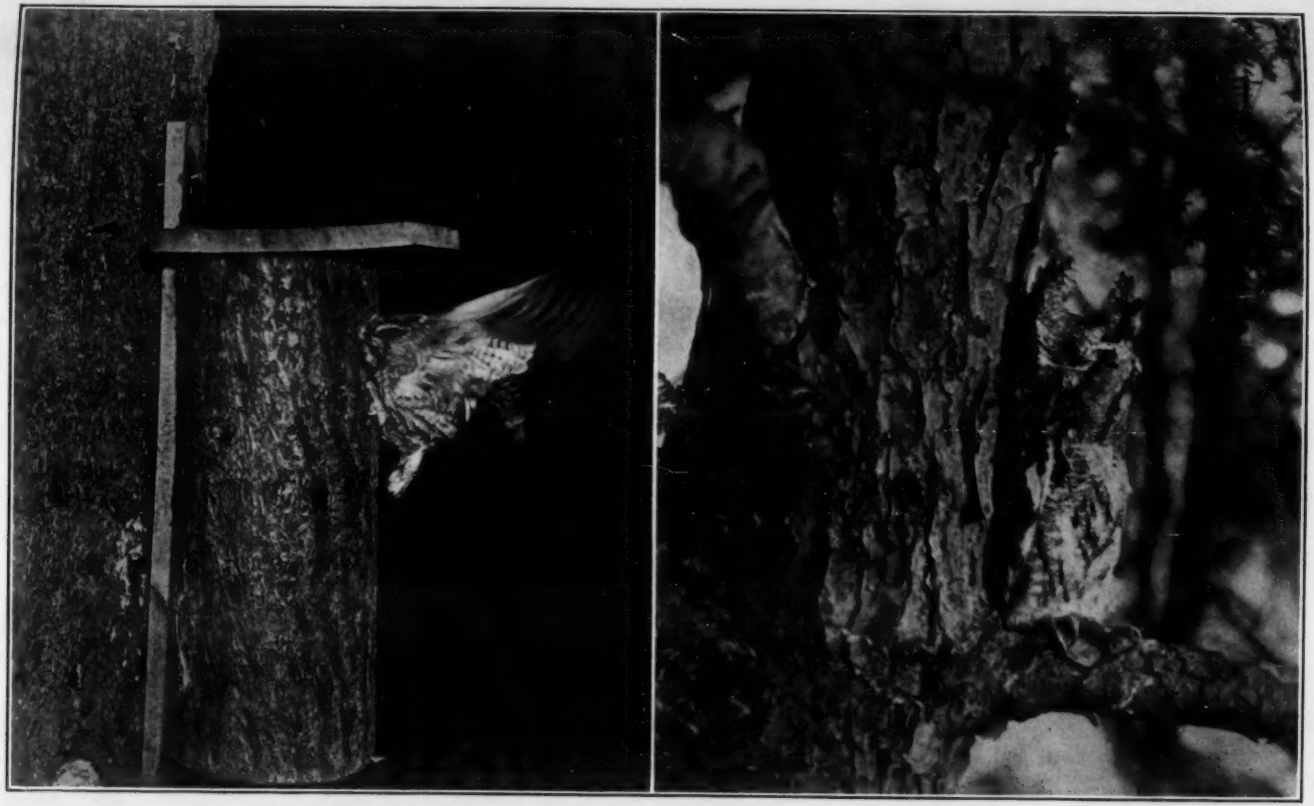
June 9: Crayfish, bones and scales of small fish, noctuid moth, feathers of Wood Pewee.

June 10: Parts of young rat, cricket, spider, crayfish, no feathers.

June 11: Four crayfish, one large earth worm, two June beetles, no feathers.

June 12: Two crayfish, one earth worm, one purple salamander, feathers of Yellow Warbler.

June 13: Four crayfish, one stonefly, feathers of immature Song Sparrow.
June 14: Piece of skull and lower jaw of young rat, dusky salamander, parts of alewife.
June 15: Remains of young rat, two June beetles, crayfish, feathers of female Tanager.
June 16: Remains of young rat, fish bones, crayfish, cutworm, two pellets.
June 17: Flesh (probably rat or mouse), crayfish, fish bones and scales.
June 18: Crayfish, remains of young rat, cricket, 3 June beetles, head of Chipping Sparrow, one pellet.
June 19: Crayfish, cricket, bodies (minus heads) of two juvenile Phoebes.
June 20: Dusky salamander, two crayfish, large spider, land snail, earth worm.
June 21: Crayfish, two earth worms, skin of meadow mouse, feathers of Robin, Downy Woodpecker, female Goldfinch, House Sparrow, two pellets.
June 22: Wood frog, pelvis of young rat, entire Chipping Sparrow, three pellets.
June 23: Crayfish, dusky salamander, scapula of young rat, feathers of Chipping Sparrow.
June 24: Crayfish, stonefly, dusky salamander, wing of juvenile House Sparrow, headless body of juvenile Field Sparrow.
June 25: Two crayfish, two stag beetles, one small garter snake, feathers of Chipping Sparrow and leg of female Tanager, one pellet.
June 26: Crayfish, earth worm, dusky salamander, ribs of young rat, entire short-tailed shrew, feathers of Field Sparrow, one small pellet.
June 27: Feathers of immature Yellow Warbler and Chipping Sparrow, small pellet.
June 28: Fur of shrew and feathers of House Sparrow.
June 29: Dusky salamander, earth worm, June beetle, fur of meadow mouse and feathers of Redstart and female House Sparrow.
June 30: June beetle, feathers of Chipping Sparrow and of young Owl eaten by his brothers, two pellets.
July 1: Seven noctuid moths, one orange underwing moth, scavenger beetle, crayfish, feathers of Redstart and Phoebe.
July 2: Three noctuid moths, one underwing moth, feathers of male Redstart, Downy Woodpecker, Yellow Warbler, and Field Sparrow, two pellets by evening.
July 3: Four noctuid moths, one underwing moth, feathers of House Sparrow, Yellow Warbler, Downy Woodpecker, and Goldfinch.
July 4: Cecropia moth, feathers of female Tanager, two Goldfinches, two Waxwings, two Phoebes, and female Redstart, two pellets.
July 5: Many moths fed the night before but none spilled. Feathers of Catbird, female Tanager, Phoebe, Waxwing, male Redstart, and Chipping Sparrow, two pellets.



1. SCREECH OWL ALIGHTING AT ENTRANCE TO NEST, 1/300 SECOND EXPOSURE DURING THE FLASH.
2. THE SCREECH OWL ROOSTING DURING THE DAY IN A HEMLOCK NEAR NEST.

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July 6: Entire Chipping Sparrow, two pellets.
July 7: One noctuid moth (many moths were fed the night before).
July 8: Crayfish, one noctuid moth and one gray underwing.
July 9: Seven noctuids, feathers of Field Sparrow, Chipping Sparrow and Yellow Warbler.
July 10: Two noctuids, feathers of Yellow Warbler, Goldfinch, Chipping Sparrow, and male House Sparrow.
July 11: Feathers of Yellow Warbler, Goldfinch, Waxwing and House Sparrow, three pellets.
July 12: Crayfish, feathers of Barn Swallow and Waxwing.
July 13: Two pellets, nothing else.
July 14: Feathers of Phoebe and Yellow Warbler, four pellets.
July 15: Helgramite, feathers of Waxwing, Phoebe, and Red-eyed Vireo.
July 16: Feathers of House Sparrow, one pellet.
July 17: Nothing, no pellet.
July 18: Two Red-eyed Vireo feathers, no pellet. Bird then deserted.

To summarize: remains of birds were found on 35 days, insects on 28 days, crayfish on 24 days, amphibians on 15 days, mammals on 12 days, fish on 6 days, and spiders, snails, and reptiles on one day each.

The preponderance of bird remains is, of course, due to the fact that it was impossible for them to eat a bird without dropping some of the feathers, especially as they usually fought over it before it was eaten. Insects, on the other hand, were not recorded unless they happened to be dropped outside of the cage where the young could not reach them. The quantity and variety of the food consumed is merely intimated by what was left each morning, any estimate of the amount eaten based upon it would be far from exact. The number of birds, however, is doubtless a nearly accurate record of what were eaten although occasionally birds were brought to the cage rather cleanly picked and some of these may have been swallowed without leaving any traces. During the 45 days that the young Owls were in the cage, 77 birds of 18 species were brought to the young, as follows:

Screech Owl	1	Swamp Sparrow	1
Downy Woodpecker	3	Scarlet Tanager	5
Phoebe	9	Barn Swallow	1
Wood Pewee	1	Cedar Waxwing	6
House Sparrow	10	Red-eyed Vireo	2
Goldfinch	6	Yellow Warbler	8
Chipping Sparrow	9	Redstart	6
Field Sparrow	4	Catbird	2
Song Sparrow	2	Robin	1

An examination of the nest debris which had accumulated prior to June 2 was made and found to consist chiefly of feathers. There were a few bones of mice and young rats, a few of the heavy mandibles of beetles, and the feathers of 16 species of birds, as follows: Phoebe, Baltimore Oriole (male and female), Goldfinch, White-throated Sparrow, Chipping Sparrow, Song Sparrow, Indigobird, Scarlet Tanager (male and female), Cedar Waxwing, Red-eyed Vireo, Yellow Warbler, Redstart (male and female), Veery, Olive-backed Thrush, Hermit Thrush, and Robin. Add to this list a male Tanager fed June 2 and a Red-eyed Vireo fed June 3 and it brings the total of birds eaten to 24 species and at least 98 individuals. Since the feathers in the nest undoubtedly represent many more than one bird of each species, the grand total of birds required to feed the three young Owls from the time of hatching until left by the old birds was certainly over a hundred.

Amount of food: In order to determine the amount of food consumed by the young, and the period of activity during the night Mr. McNeill remained in the blind, as before stated, the nights of June 29 and 30, July 1, 3, 4, 5, and 6.

The night of June 29, the young were first fed at 8:49 and between then and 2:50 they were fed 20 times mostly on moths and beetles but including one deer mouse and one Chipping Sparrow. At 2:50 the young Owls began to fight and eventually killed and ate one of their brothers, the old birds not coming to feed again that night.

The night of June 30, the young birds were first fed at 8:39 and between then and 4:15, when it began to rain, they were fed 73 times, mostly on moths and beetles but including two salamanders, a mouse, and two birds.

The night of July 1, they were first fed at 8:40 and between then and 3:49 were fed 36 times at rather regular intervals. The food was mostly noctuid moths but it included one mouse and four birds.

The night of July 3, the young Owls were first fed at 8:44 and last at 4:15. They were fed but 14 times, eight birds and six insects. The birds were brought at fairly regular intervals during the night, as follows:

9:35	female Redstart	3:15	Cedar Waxwing
11:00	Goldfinch	3:39	Goldfinch
1:45	female Tanager	4:00	Cedar Waxwing
2:30	Phoebe	4:15	Phoebe

The night of July 4, the young Owls were first fed at 8:34 and between then and 1:40 were fed 75 times, two beetles and 73 moths. The birds then became quiet and as it was very chilly Mr. McNeill left. The next morning I gathered the feathers of six birds that had evidently been fed to the young after 1:40: Phoebe, Scarlet Tanager, Cedar Waxwing, Chipping Sparrow, Redstart, and Catbird.

The night of July 5, the birds were first fed at 8:25 and last at 3:55. There were 67 feedings, mostly moths with a few beetles interspersed, and one salamander, one frog, and one Chipping Sparrow.

The night of July 6, the birds were first fed at 9:12 and last at 4:03. There were 72 feedings entirely of moths with the exception of three salamanders.

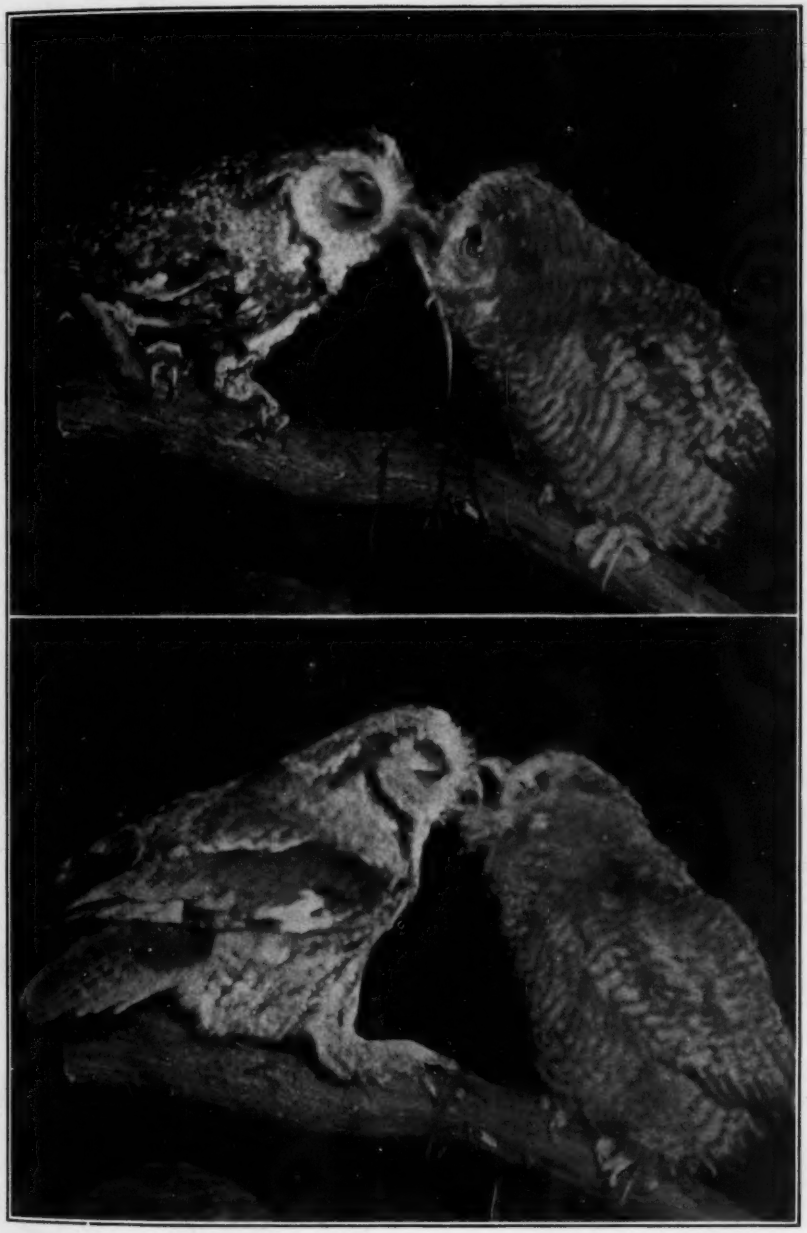
From these data it is seen that the Owls were active all night but that the amount and nature of the food varied considerably from night to night, so much so, in fact, that one hesitates to make any general deductions. The nature of the food evidently depends upon what is most easily secured and is largely a matter of chance. The dying of the alewives in Cayuga Lake during early June made available a food supply at that time; the night wanderings of salamanders and crayfish throughout the month of June made them available until the first of July when they disappeared from the dietary almost as suddenly as did the alewives. Then the warm nights of early July brought out the Noctuid moths by the thousands and they then became the main article of diet. The presence of the young rats in the menu during the last two weeks of June is accounted for by the several litters that then appeared about the hatching coops by the pond where the corn for the setting hens attracted them.

The presence or absence of birds in their food seemed to depend entirely on chance. There were many more adult birds than young or immature and they were taken on clear nights and cloudy nights alike and at all hours of the night. More of the dull-colored

female than bright male Tanagers were captured but an equal number of male and female Redstarts were taken. The majority of birds doubtless came from the immediate vicinity, but the Swamp Sparrow and the Barn Swallow must have come from at least half a mile away. The largest number was taken between the 2nd and the 11th of July, but on the 7th and 8th not a bird was taken. All of these contradictory facts seem to point to the element of chance being most important in deciding whether or not birds appear in their food.

If chance is so important in deciding the Screech Owl's menu, it may well be that in a region or area where there are fewer birds and more mice, birds form a smaller percentage of their diet. It would not be fair to the Owls to decide their economic status upon observations of a single pair where conditions for catching birds are very favorable. I will have to admit, however, that the supply of rats and mice in the vicinity of the nest was not in the least exhausted by the inroads of the Owls nor did they, in fact, make any visible impression upon their numbers. I will likewise have to admit that of three other Screech Owl's nests examined in previous years, one in an orchard, one in a woodland, and one in a lone tree in a swampy field, all contained quantities of feathers. The last mentioned was ideally situated for a mouse-loving bird, for field mice were extremely abundant about the low lying ground. In spite of this fact, upon examining the debris of the nesting cavity, Mr. L. A. Fuertes and I were able to pick out easily the feathers of nineteen species of birds that had been victims of the Owls, and there were a number of others of which we were in doubt as to the exact species. The birds identified with reasonable certainty were as follows: Downy Woodpecker, Phoebe, Kingbird, Red-winged Blackbird, Baltimore Oriole, Song Sparrow, Field Sparrow, House Sparrow, Scarlet Tanager, Barn Swallow, Red-eyed Vireo, Nashville Warbler, Yellow Warbler, Myrtle Warbler, Magnolia Warbler, Chickadee, Veery, Olive-backed Thrush, and Bluebird.

A number of careful observers to whom I have confided the wickedness of this pair of Owls have informed me that they have had Owls nesting near their homes and have never known them to catch birds. In reply, I have to admit that, except when I found the two birds cached on the branches of the hemlocks



1. SCREECH OWL FEEDING RED-BACKED SALAMANDER TO ITS YOUNG.
2. SCREECH OWL FEEDING BEETLE. NOTE THE HALF-CLOSED EYES OF THE ADULT BIRD IN EACH PHOTOGRAPH.

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already mentioned, I never had any intimation that these Owls caught birds either. I have always been delighted to have them about and have put up boxes to attract them. Indeed after I had watched them for many evenings until ten or eleven o'clock and seen them bring dozens of moths and beetles and salamanders, but no birds, I was almost willing to believe that they had not killed all the birds whose feathers lined their nests.

The effect of the Owls on the bird life of the sanctuary was not what one might expect from the number of birds which they devoured. True, a pair of Baltimore Orioles that had nested in the maple by the house for five years disappeared, and there seemed to be fewer Chipping Sparrows than usual. But there was the Phoebe undisturbed just across the pond, and Yellow Warblers, Redstarts, Song Sparrows, Robins and Veeries nested almost as close. The number of birds nesting in the sanctuary was but three pairs less than the year before and it was four pairs higher than any other year. The number of species was greater than the year before, though less than other years, but this I account for by the increase in House Wrens whose fondness for breaking eggs has driven out several species that regularly nested before the Wrens became so numerous. A summary of the nesting birds of Glenside follows:

1917, 34 pairs of 18 species	1920, 38 pairs of 19 species
1918, 34 pairs of 22 species	1921, 45 pairs of 15 species
1919, 27 pairs of 16 species	1922, 42 pairs of 17 species

It is true that relatively few young were raised this year but so far as casual observations might go, there were nearly as many birds at the end of the summer as at the beginning. At any rate there was not enough difference to lead one to suspect any great holocaust. The fact that few young were raised and that the number of old birds remained about constant might lead one to suppose that the Owls fed upon the young, but such was not the case. The seeming persistence of the old birds was not real. The Phoebes that nested in plain view of the Screech Owls succeeded in raising one young and got their second brood nearly to maturity. The Yellow Warblers persisted until a high wind dislodged their nest. Three Scarlet Tanagers continued singing all summer; and all this in spite of the fact that the Owls fed their young nine Phoebes, eight Yellow Warblers, and eight Scarlet Tanagers.

The fact that birds nested in apparent safety so close to the Owls led me to suppose that the Owls did their hunting far from home, but such again was not the case. More careful observation showed that the Phoebes and Yellow Warblers and Tanagers that finished the season were not necessarily the same ones that started it. How many times new mates were secured by each bird, I am unable to say, but a few examples of what happened will indicate how a large percentage of the Owls' food may have come from the vicinity without affecting materially the total bird population of the area.

On May 6, the Phoebes had completed their nest and laid one egg. Just what happened first I do not know but no more eggs were laid and this egg did not hatch for nearly three weeks. Not knowing about the destructiveness of the Owls at the time, I merely wondered at the single egg and the long period of incubation Had I been suspicious of anything I probably would have noticed the disappearance of the first female and the appearance of another. It was the last of June before a second brood got started and then after the eggs had hatched one of the birds lost its tail and became quite disheveled as though it might have had a midnight encounter with the Owl. It continued to help feed the young for several days, however, until July 5, when it disappeared and its place was taken by a bird with a full tail. This bird did not last long, however, nor did the mate, the two birds disappearing on successive nights July 14 and 15. The young were nearly fledged at this time but before I realized what had happened they had died in the nest.

About a month later, the middle of August, another Phoebe appeared at the pond, visited the nest and lingered about the cliff for several days before it moved on. Now, had I not known what happened to the original birds, I might have supposed that they had raised their young in safety and had taken them away to other feeding grounds, and that this August bird was one of the old ones coming back again to visit the old nest. As a matter of fact, the young birds had died in the nest and the Owls had feasted on at least four old Phoebes and possibly others.

In the case of the Scarlet Tanagers, there were three pairs that nested in the vicinity and the males had regular singing stations

where they could be heard every morning without fail. One of these birds stationed himself in the elm in front of the house where he sang regularly every morning and most of the day. The morning of June 3 he was silent and an examination of the Owl box showed fresh Tanager feathers. The very next day, however, a male Tanager took up his stand 100 feet away in the oaks across the street and was undoubtedly mated to the same female. Had I not been looking for trouble, I probably would not have noticed the day's absence of the Tanager and would have assumed that he had merely moved his singing station a hundred feet.

The ease with which birds find new mates when they have been bereaved is one of the marvels of bird life that is rather difficult to understand. I believe that practically all birds are much more attached to their nesting sites than they are to their mates and that the death or disappearance of the mate does not affect the other bird seriously. This does not, however, explain how there can be so many free unmated birds around to fill in the gaps.

The only explanation which I can offer to this problem is based upon the study which I made of the Red-winged Blackbird some years ago. In this paper[1] I pointed out the long migration period of a bird that is supposed to be an early migrant: how, though the migrant adult males arrive early in March, there are still immature resident females arriving as late as the middle of June. My suggestion would be that the migration of almost all birds is similar and that Nature provides for the catastrophes that may happen to mated birds by causing the immature birds to feel the migrating instinct later, so that they arrive on the nesting grounds after all the adult birds are mated. Then they are able to fill in the chinks that have been made by Hawks and Owls and cats and other agencies of destruction.

If such is the case we would explain the disappearance of the Orioles from the tree which had sheltered them for five years by the fact that they were both taken the same night or on successive nights before the survivor had time to find a new mate. In a similar way several pairs of Chipping Sparrows disappeared while one pair apparently lived through the season, though no one knows

[1] The Red-winged Blackbird: A Study in the Ecology of a Cat-tail Marsh by A. A. Allen. Proc. Linn. Soc. N. Y. April 15, 1914.

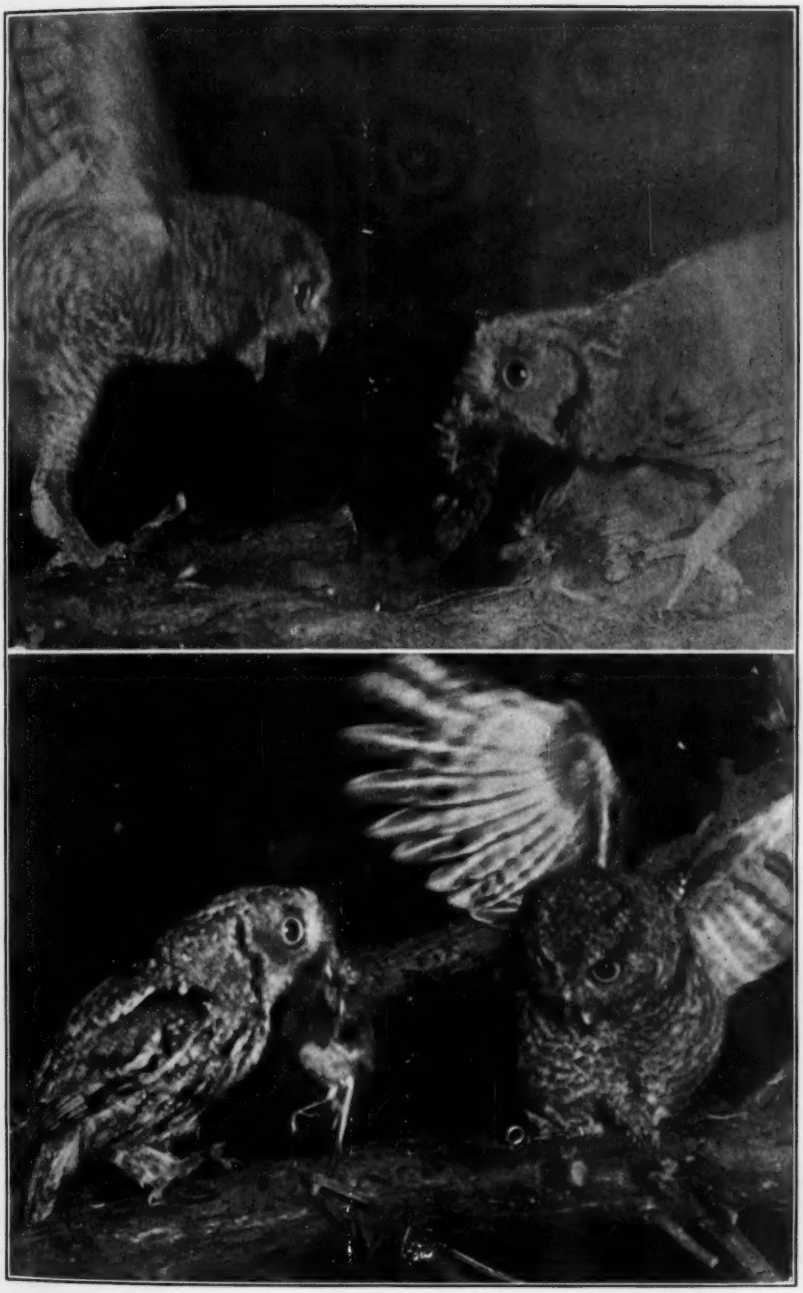
with how many rematings. And similarly with all the other birds. It would really be possible for the Owls to live entirely upon birds without it necessarily showing conspicuously on the bird life of the vicinity.

A year has passed since the foregoing was written. Publication has been delayed so that the effect of the Owls' destruction to the bird life of the Glenside Sanctuary in 1922 could be determined. Once more an accurate record of the nesting birds has been kept and charted on the map of the area with the following result for 1923: 44 pairs of 18 species. This is an increase of two pairs and one species over 1922 so that grossly the destruction by the Owls in 1922 had no apparent effect on the total number of birds nesting in the area.

An analysis of the different species shows an increase of one pair of Wood Pewees, Cowbirds, Redstarts, Veeries, and Robins and the appearance of one pair of Downy Woodpeckers, Red-eyed Vireos, Chickadees, and Bluebirds which did not nest within the area in 1922. There was a decrease of one pair of Screech Owls, Indigo-birds, and Louisiana Water-Thrushes and two pairs of Song Sparrows and Catbirds, while Chimney Swifts, Phoebes, Goldfinches, Chipping Sparrows, Scarlet Tanagers, Yellow Warblers, and House Wrens remained constant.

A comparison with the list of birds destroyed by the Owls the preceding year shows that two of the species which show decrease did not occur in their menu and the other two decreased more than the actual number of birds eaten by the Owls. On the other hand species that were eaten in considerable numbers as the Phoebe and Chipping Sparrow either held their own or as in the Downy Woodpecker and Redstart actually showed a slight increase. This leads us to the belief that the decrease in certain species must be accounted for in some other way than by destruction by the Owls, and that while the Owls may have prevented much of an increase in the number of birds nesting in the given area, they did not materially affect the normal population.

A further analysis of the species nesting within the sanctuary in 1923 shows that the Baltimore Orioles which were exterminated in 1922 by the Owls catching both birds the same night were not replaced in 1923. Chipping Sparrows which were reduced in the



1. SCREECH OWL TEARING HEAD FROM BIRD (CEDAR WAXWING ?) FOR ITS YOUNG.
2. SCREECH OWL THE SAME NIGHT, JULY 3, 1922, WITH FEMALE REDSTART. YOUNG IS HERE ABOUT TEN WEEKS OLD.

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same way from five pairs in 1921 to one pair in 1922 likewise did not recuperate, though Veeries, which were reduced from four pairs to one, advanced to two pairs in 1923. The pair of Phoebes which nested in 1923 were obviously new birds for all of the 1922 crop were destroyed by the Owls. It was interesting to observe that they first went to an entirely new place to nest, on the back of a building where Phoebes had never nested before, but that, when their eggs were thrown out of this nest by the House Wrens, they betook themselves to the old nest of the 1922 Phoebes, put in a new lining, and raised two broods in it successfully.

Just where the Owls nested this year I was unable to ascertain though they made occasional visits to the sanctuary. That they did most of their hunting elsewhere, however, was evidenced by the fact that the majority of our birds were successful in raising their young on schedule time without having to find new mates. But one instance of this kind fell under my observation this year, that of a Goldfinch where there was apparently a change of mates during incubation, the second female being considerably darker than the first. This second female was apparently secured so rapidly after the disappearance of the first that the eggs were not even chilled to the point of killing the germ for they hatched eight days after the change took place, the new female having laid two eggs of her own in the meantime which naturally did not hatch.

SUMMARY.

1. A pair of Screech Owls nested in a Flicker box close to the author's home and a record was kept of the food brought to the young between June 4 and July 18.

2. The food consisted of birds, insects, crayfish, amphibians, mammals, fish, spiders, snails, and reptiles.

3. The record of food brought to the young included 98 birds of 24 species.

4. The Screech Owls were engaged in feeding their young from shortly after dusk until just before dawn in all kinds of weather.

5. Birds were brought at no definite intervals nor in definite numbers, chance seeming to determine the time of feeding and the number fed.

6. The Owls were very quiet and inconspicuous in their feeding operations and gave little intimation to the casual observer of the destruction to bird life that they were committing.

7. When both of a pair of birds were killed the same night by the Owls, that pair ceased to be represented in the sanctuary, but if only one was taken, the survivor secured a new mate almost immediately so that the destructiveness of the Owls was in this way covered up.

8. Birds are able to secure new mates rapidly because of the unmated, immature birds which are usually available on account of their later migration period and the later maturation of their reproductive organs.

9. A census of the birds nesting in the sanctuary in 1923 showed a slight increase in the total number rather than a decrease, though all species exterminated in 1922 failed to reappear in 1923.

CONCLUSION.

In making the statement that the total bird population of the area under consideration was not materially affected by the inroads of the Owls, I do not wish to minimize the destructiveness of the birds. It may well be that, had it not been for the Owls, there would have been a very substantial increase in the bird population. The facts merely express in different words the time-honored phrase that the carnivorous birds help "to maintain the balance of nature." There can be little doubt that the number of insects and small mammals destroyed by this pair of Owls could never compensate for the destruction of one tenth of the insectivorous birds eaten by the young. Though the Owls might spend the rest of the year feeding entirely upon insects and meadow mice, they could not possibly consume the equivalent of what would have been eaten by the 93 birds destroyed during the short space of eight weeks.

From the data here presented it seems evident that the Screech Owl is a powerful factor in maintaining the balance of nature but, from the standpoint of increasing insectivorous birds, he is an equally powerful menace.

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CRITERIA FOR THE DETERMINATION OF SUBSPECIES IN SYSTEMATIC ORNITHOLOGY.[1]

BY FRANK M. CHAPMAN.

I AM fully aware that an adequate presentation of this subject would require far more time than could well be accorded me on this occasion. Nor in any event could I expect to treat it in a manner which would meet with the approval of systematists generally. I feel, however, that it is a subject which demands discussion. The principles governing the procedure of systematists are now so diverse that until they have been harmonized it is useless to expect uniformity in method. This paper, therefore, is offered with a hope that it may lead to a general exchange of views and thereby prepare the way to the establishment of common standards in determining the status of representative forms.

The cytologist reaches definite conclusions concerning the status of a species through a study of its germ-cells; the experimental biologist determines the relationships of allied forms by the results of his attempts to breed them, but the systematic ornithologist defines species in terms of their external characters of size (including relative proportion of parts), color, and pattern of coloration plus their distributional relationships and, in some instances, their habits and voice.

The fundamental test of specific standing is non-intergradation with other forms. The indisputable proof of the specific distinctness of two or more forms is their occurrence together when breeding without intergradation.

The Greater and Lesser Scaup Ducks, the Downy and Hairy Woodpeckers, the Alder and the Acadian Flycatchers, the Common Crow and Fish Crow, the Gray-cheeked and Olive-backed Thrushes are more like each other than are many subspecies; but wholly aside from the absence of intermediates, the fact that they occupy in whole or part the same area when breeding and still maintain

[1] Read before the Annual Meeting of the American Ornithologists' Union, Cambridge, Mass., October 10, 1923.

their distinguishing characteristics is, to the ornithologist, final proof of their specific distinctness. The cytologist may discover the same number of chromosomes in the germ cells of the Crow and the Fish Crow, the experimental biologist may produce fertile offspring from a union of the Greater and Lesser Scaups, but they will still remain species in the eyes of the systematist simply because they are associated in nature when breeding but do not intergrade.

In cases of this kind, therefore, the ornithologist is not at loss for a satisfactory test of specific distinctness without regard to degree of difference. It is when forms which resemble each other more or less closely are not associated while breeding but replace one another in areas which may or may not be connected that, lacking specimens to demonstrate their exact relations, he must decide whether to treat them as species or subspecies.

The easiest way out of this difficulty is to follow one or the other of two general rules in more or less current use.

1. Within certain limits of differentiation to consider all presumable representative forms as subspecies whether or not they are known to intergrade and whether or not their breeding ranges are contiguous or are widely separated.

2. To treat all obviously representative forms as species until their intergradation is proven.

While the adoption of either of these rules has the merit of consistency, their use often leads to such biologically incorrect results that no mere question of expediency can, in my opinion, pardon their acceptance.

Better be inconsistent than deliberately to handicap one's experience and discrimination by blind adhesion to a law which, however convenient it may be in practice, inevitably leads to false and misleading representations. Furthermore, it seems perfectly logical to insist that if a systematist refuses to rank certain forms as subspecies until their intergradation is proven, he should also refuse to treat them as species until the fact of their non-intergradation is established. Certainly in many cases we have no more right to assume that intergradation does not occur, than we have to assume that it does occur. Errors we are bound to make in any event, but there is assuredly no excuse for making them by unreasoning adherence to a purely arbitrary man-made law.

Is it not more scientific to treat each case on its merits, basing our conclusions on due consideration of all the available pertinent evidence? Systematic zoology has a higher end to serve than mere classification, and its nomenclature, should, so far as its limitations permit, express our knowledge of relationships. In the study of both physical and geographic origin of species it is of fundamental importance for us to know whether given forms are species or subspecies. It is evident, therefore, that their value as factors in problems of evolution and zoogeography is measured by the correctness of our classification. To the best of his ability and in the light of his material and experience the systematist should attempt to supply this information. If his labors have brought him into disrepute among biologists is it not because he has so often treated his specimens as dried skins rather than as biologic facts?

Our problem seems deceptively simple. Briefly, it requires us to decide when to treat representative forms as species, and when as subspecies. "Form," it should be explained, is the indefinite term which the systematist employs when he is in doubt whether to write "species" or "subspecies." Representative forms, then, are species or subspecies which so closely resemble one another that one evidently replaces the other. Whether they have descended from a common ancestor by different lines of descent, or whether one has arisen from the other, whether their differentiation is due to environmental or external factors or to mutational and internal causes are all subjects for inquiry, and our findings are, in a measure, expressed by our nomenclature.

The systematist knows that many proved subspecies differ far more from one another than do many species. It is not necessary therefore for us to distinguish between them when we list the characters on which species and subspecies are usually based. These are:

1. Size, including relative proportion of parts.

2. Color, including variations in intensity of color and actual differences in color.

3. Pattern of coloration, including variations in area, due primarily to increased or decreased pigmentation; variations in marking of individual feathers and the presence or absence of such "unit

markings" as wing-bars, pectoral crescents, superciliary lines, etc.

4. Shape, as it may be affected by increase or decrease in size or be expressed in the form of certain feathers.

In spite of the fact that these characters are present in both species and subspecies, we inquire which of them are most commonly considered of specific, which of subspecific value?

VARIATIONS IN SIZE.

Wide-ranging species so frequently differ in size geographically that laws have been formulated to express the normal trend of this type of variation. Thus J. A. Allen in 1876, writing on 'Geographical Variation among North American Mammals, Especially in Respect to Size,' advanced the following generalization[1].

"The maximum development of the individual is attained where conditions of environment are most favorable to the life of the species." Generally speaking it is the individuals of a species from the highest latitudes and altitudes which are the largest. Wide-ranging species, therefore, are sure to encounter conditions which usually produce variation in size and if their range be continuous the change in these conditions—and hence the change in size—is as gradual as the change in latitude or altitude itself. Variation in size, therefore, is the most common type of geographic differentiation. It is exhibited by great numbers of species which in other respects are essentially alike throughout their range. Moreover, as an expression of environment it keeps pace with range, and when a species is more or less continuously distributed we expect a complete intergradation in size between its largest and smallest members.

The assumption therefore seems warranted that when representative forms differ from each other only in size they will intergrade if their ranges are connected. The question, however, arises if the ranges of such forms are not connected and when their differences in size are not bridged by individual variation, shall we treat them as different species or shall we assume that they are organic units which would fuse were their ranges to be joined?

[1] Bull. Geol. and Geogr. Surv., II, No. 2, p. 310.

Our action here may be governed by either one or the other of the procedures above mentioned or it may be determined by the light of our experience. On the one hand we know that many representative forms differing only in size intergrade and are therefore properly classed as subspecies. On the other, we know that size alone is in some cases a specific character and that species differing only in size nest in the same area without intergrading. From Bolivia to eastern Colombia two Toucans (*Ramphastos cuvieri* and *R. culminatus*), which are minutely alike in color and differ only in size,[1] occur together without intergrading. The difference between them is not extremely pronounced, but it is obviously sufficient to keep the two apart as distinct species. Now it happens that two other Toucans (*Ramphastos ambiguus* and *R. abbreviatus*) are found which also differ from each other only in size. In this case, however, their ranges do not coincide, the larger bird occurring in the Subtropical Zone of eastern Colombia, the smaller in the Tropical Zone of western Colombia. Whether or not their ranges are connected I do not know. Meanwhile shall we treat them as species or assume that if their ranges were connected they would intergrade and hence rank them as subspecies?

If the two Toucans first mentioned had not shown us that to them mere size may make a species, I confess I should treat these two representative Colombian Toucans as races on the assumption that they did or would intergrade, but reasoning by analogy I accord them specific rank.

In Central America two species of Flycatchers of the genus *Myiarchus* are found associated which differ only in size, and that so little that Ridgway,[2] after naming one of them as distinct from the other expressed doubt of its validity. Bangs,[3] however, has shown that they are distinct, and in this belief he is supported by Miller and Griscom who have met both birds in life. Possibly both Toucans and Flycatchers may possess notes and habits which distinguish them.

A more familiar illustration of representative species which differ only in size, plus the presence in one of a slight whitish

[1] *R. culminatus* averages, wing, 199; tail, 146; culmen, 123 mm.
[1] *R. cuvieri* averages, wing, 242; tail, 155; culmen, 172 mm.
[2] *Myiarchus nuttingi brachyurus* Ridgw., Bull. 50, IV, U. S. N. M., 1907, p. 630.
[3] Proc. Biol. Soc. Wash., 1909, p. 34.

margin on the wing-coverts which is absent in the other, is afforded by our Black-capped and Carolina Chickadees. In spite of the fact that these two birds more closely resemble each other than do hundreds of subspecies, and that their ranges are not separated, they do not intergrade. Here we know that there are differences in voice markedly apparent to our ears and doubtless more so to Chickadees'.

Other well-known cases of species which are distinguished wholly or almost wholly by size are supplied by the Greater and Lesser Yellow-legs,[1] Hairy and Downy Woodpeckers, Common Crow and Fish Crow, and here also we know that there are recognizable differences in voice.

Notwithstanding these and similar instances it is certainly customary for representative forms differing only in size to intergrade if their ranges are connected, and when intergrades are lacking, we are, I think, more warranted in ranking them as subspecies than as species. A distinction, however, should be made between difference in size and difference in proportion. In the first, all the parts commonly used in comparison, bill, wing, tail, tarsus, etc., may show the same relative variation in size. In the latter, their variations may be disproportionate, or one member may be larger, another smaller, than those of the allied form, and such instances are more complex, less explicable than those in which the variations are all in the same ratio.

VARIATIONS IN COLOR.

The color characters which distinguish representative forms from one another may be roughly classified as differences of degree and differences of kind. The first includes those variations in intensity of color which we have learned to associate with climatic environment and which are so strikingly illustrated by the classic cases of the Song Sparrows and the Horned Larks.

A very large proportion of our subspecies are based on these differences in degree of color. Increase in the color of plastic, responsive species so commonly accompanies increase in rainfall,

[1] In this connection, however, reference should be made to J. T. Nichols' description of the skeletal differences between these two species and particularly to his suggestive comment that they are not so closely related as their "similarity in plumage would lead one to suppose" (Auk. Oct. 1923, p. 594).

and the reverse so frequently accompanies decrease in rainfall, that we have come to consider the relation between humidity and dark colors, and aridity and pale colors, as one of cause and effect. Thus the systematist can tell with some approximation to truth the annual precipitation in a given region from an examination of its breeding Song Sparrow. The characters separating representative forms of this kind are apparently the expression of an existing environment. When, therefore, the environments, so to speak, intergrade, we may be reasonably sure that the forms to which they have given rise will also merge; and under such conditions it is customary to rank them as subspecies without the confirmation of intergrading specimens. But again, I ask, when the ranges of such forms are separated, prohibiting fusion by contact, and when the birds are too unlike each other to intergrade by individual variation, how shall we classify them?

The systematist to whom the fact of non-intergradation is a sufficient test replies "as species;" but I am convinced that it is often biologically incorrect and misleading to follow this course.

Is the Towhee of Guadalcupe Island any less a race of *Pipilo maculatus* because its range is insular and hence isolated? Is the Horned Lark of the Bogotá, Colombia, Savanna any less a race of *Otocoris alpestris* because its range is separated from its nearest relative by all Central America?

To rank these birds as species is, to my mind, not only biologically false but it results in the adoption of a nomenclature which to an extent conceals their origin and relationships.

In assuming that representative forms of this kind would intergrade if their ranges adjoined, we are on safer ground than with forms differing only in size. Birds which resemble each other in everything but size we have seen may live together as distinct species, but I do not recall an instance of two birds differing only in degree of color being associated as species. It appears, therefore, that this type of differentiation is racial or subspecific rather than specific in character and representative forms distinguished by it may be expected to intergrade.

It is sometimes difficult to distinguish between the cumulative effect of differences of degree and differences of kind in color, as well as in pattern. Increased pigmentation may result in such

excessive deepening of tone as to give an apparently new color, and in such change of area as to produce an essentially different pattern. Examples of these types of differentiation are shown by the Song Sparrow (*Melospiza*), Horned Lark (*Otocoris*), Seaside Sparrow (*Passerherbulus*), and many other species.

Such characters, though far more pronounced than many which separate unquestionably distinct species, are still subspecific in their origin and nature, and their possessors may be expected to intergrade if directly or indirectly their ranges are connected.

When the characters distinguishing representative forms become so pronounced as to be actually different colors they are usually accompanied by change in pattern as well. It is therefore difficult to draw a line between these two types of differentiation. However, among North American birds, the Magpie and Yellow-billed Magpie, the Myrtle and Audubon's Warblers, the Maryland and Belding's Yellow-throats, are examples of representative species which differ in color, but agree essentially in pattern of coloration.

VARIATIONS IN PATTERN AND FORM.

Familiar illustrations of representative forms among North American birds, which differ from each other chiefly in pattern of marking, are the eastern and the western Towhees (*Pipilo erythropthalmus* and *P. maculatus*), the Mourning and Macgillivray's Warblers (*Oporornis philadelphia* and *O. tolmiei*), the Canada Jay and Oregon Jay (*Perisoreus canadensis* and *P. obscurus*). Although each of these birds more nearly resembles its representative than do many undoubted subspecies, the character of their distinguishing differences has won for them recognition as species.

It seems evident that the evolutionary influences which produce these qualitative differences of color and form are not the same as those to which we may attribute quantitative variations in the same color. The former are mutational in character and appear to be the external expression of internal or germinal processes stimulated by unknown factors, past or present; the latter seem to be the obvious product of an existing climatic environment.

The differences in color or pattern separating two species may be less in quantity than those which distinguish two subspecies, but they are obviously unlike in quality and the birds exhibiting

them give proof of the truth of this belief by living together, or in adjoining ranges without intergrading.

This fact, therefore, must be taken into consideration when in the absence of specimens and detailed information in regard to range, we attempt to determine the probable relationships of two representative forms.

OTHER FACTORS IN THE PROBLEM.

Aside from the extent and nature of the characters separating representative forms there are other factors to be considered in forming an opinion of their relationships.

Differentiation in but one sex.—The differentiating characters of both species and subspecies may be shown by only one sex, either the male or the female, without affecting the status of the form. Thus the males of representative forms may be exactly alike but if the females show those differences in color and pattern which we commonly consider of specific value, then, notwithstanding the similarity of the males, the two birds should rank as species. The same rule applies when the males are unlike and the females alike.

Intergradation through a common ancestor.—It sometimes happens that two forms which have departed from a still existing common ancestor by different geographic routes, and have developed different characters subsequently meet without intergrading. Let us assume, for the sake of illustration, that a still existing Meadowlark of the Rio Grande region is the common ancestor of both the eastern *Sturnella magna* and the western *Sturnella neglecta*. These two forms we know meet in the Mississippi Valley without intergrading.[1] Intermediates are occasionally found, perhaps the result of crossing, but there is no fusion, both forms retaining their distinctive markings and uttering their quite unlike calls and songs even when their breeding ranges overlap.

In such cases birds may be subspecifically related through a third form in one part of their range, and specifically distinct in another. Our system of nomenclature is not sufficiently comprehensive and adaptable adequately to express this kind of relationship.

[1] The relationships of these birds is treated at length in Bull. Am. Mus. Nat. Hist., XXII, 1900, pp. 297–320.

In the case I have mentioned the circumstances are pronounced because the two forms actually meet in nature. There are, however, many others in which the biological problem involved is essentially the same, but in which the extremes of a connected series of intergrading races are geographically remote from each other. Under this circumstance we are less apt to ask whether they would meet as subspecies or species.

Assuming, again for the sake of illustration, that our twenty-odd races of Song Sparrows form a connected series of subspecies, it seems improbable that the comparatively small, pale *Melospiza melodia fallax* of southeastern California would intergrade, for example, with the large, dark *Melospiza melodia insignis* of Alaska.

It is not, of course, to be expected that every subspecies in a large, widely differentiated group is subspecifically related to every other race in the group. Nevertheless, even when through the exigencies of distribution they meet without intergrading and thus conform to our chief requirement for specific standing, it seems proper that we should recognize the continued existence of a common ancestor by treating them trinomially.

Intergradation by hybridization.—Intergradation by hybridization unlike intergradation by geographic variation is accomplished regardless of climatic conditions along the line of contact of the ranges of the hybridizing forms. In racial intergradation occasioned by the action of environment, it is customary to find only intergrades in the area of intergradation.

When intergradation is due to hybridization it is customary to find typical specimens of each of the parent forms as well as hybrids between them in the intergrading area. The Bronzed Grackle, for example, breeds from Texas north to Great Slave Lake and Newfoundland without exhibiting any appreciable variation but in a comparatively narrow strip from southern New England southwest along the Alleghanies, where its range meets that of the Purple Grackle, it evidently intergrades with that species by hybridization.[1]

Again, the Yellow-shafted and Red-shafted Flickers hybridize where their ranges meet throughout an area extending from Texas

[1] For the data on which this statement rests see Bull. Amer. Mus. Nat. Hist. IV, 1892, pp. 1–20.

along the western border of the Plains to Canada and northwestward to British Columbia.[1] In at least a portion of this area (Wyoming and Montana) hybrids are the prevailing type. Here, although complete intergradation occurs, the fusion of the two forms has not yet produced a uniform intergrade.

On a lesser scale hybridization also occurs with more or less regularity between the Blue-winged and Golden-winged Warblers chiefly at the junction of their ranges from northern New Jersey to the Connecticut Valley, and casually to eastern Massachusetts. The Black-capped and Carolina Chickadees also hybridize, Mr. W. De W. Miller tells me, where their breeding ranges meet in central New Jersey.

In these and similar instances both parents and their hybrid offspring are found in the area of intergradation, and they thus conform to the conditions which distinguish intergradation by hybridization from intergradation by geographic or environmental variation where only the connecting intermediates are found in the area of intergradation.

Of the cases mentioned no ornithologist would question the specific distinctness of the two Flickers and two Warblers. But it is obvious that their marked differences in color and in pattern are accorded greater significance by the systematist than by the birds themselves. Certainly they are not sufficient to prevent these species from freely mating and producing fertile offspring. It is clear therefore that they are organically more closely related than their superficial unlikeness indicates. In notes and habits the Flickers are alike, the Warblers much alike, facts which no doubt have an important bearing on their mating.

The whole subject is far too wide to be adequately treated in this connection and it is introduced chiefly to illustrate the difficulties which the systematist encounters in attempting to employ nomenclature consistently. If we are to be governed by our own definition of a subspecies as an intergrading form, the Red-shafted Flicker would be known as *Colaptes auratus cafer*, the Golden-winged Warbler as *Vermivora pinus chrysoptera*. But whatever the birds may think, it would be difficult to convince the systematist that both Flickers and Warblers are not distinct species.

[1] See Allen, Bull. A. M. N. H. IV, 1892, pp. 21–44.

Accepting therefore our artificial standards we may treat these comparatively rare cases as exceptions to the rule and continue to rank the hybridizing parents as specifically distinct. But there will always be cases of intergradation which some ornithologists will attribute to hybridization, others to the action of environment, and their nomenclatural treatment will vary accordingly.

SUMMARY.

Following this superficial review of the more important evidence to be considered in the case of species *vs.* subspecies, I append a summarized statement of the criteria which, in default of specimens, may aid us in reaching a conclusion regarding the status of representative forms.

First, the nature of their differentiations; whether they are positive or comparative in character.

Second, the degree of difference attained.

Third, the relations in space and time of their ranges; whether they are connected or separated, and if separated the extent and nature of such separation.

Fourth, the relations in their respective ranges of the environmental factors which appear to be responsible for the differentiations exhibited whether or not they merge.

Fifth, the relative plasticity of the species and of the group to which it belongs.

Sixth, relative adaptability in habit permitting continuity of range under a widely varying environment, as with the Song Sparrows, for example.

Seventh, information to be derived from the study of other birds and other organisms in the areas concerned.

Eighth, probable lines of descent with relation to the existence or non-existence of a common ancestor.

Ninth, similarity or divergence in habit and in voice.

Finally, while admitting that the relationships of representative forms can be learned conclusively only by the study of adequate collections from throughout their ranges, I nevertheless maintain that the experienced systematist employing the criteria here mentioned can, in most cases, more correctly predicate their status than if he were to act in conformance with certain rules.

And I am convinced that the systematist who will thus treat his specimens as exponents of their environment will make a far more valuable contribution to biology than he who regards them merely as objects to be classified and named.

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DIVING OF GREBES AND LOONS.

BY CHARLES W. TOWNSEND.

MR. EDWARD H. FORBUSH in a preliminary paper in the 1921 Bulletin of the Essex County Ornithological Club, and in an extensive one,—Bulletin No. 8, 1922, of the Massachusetts Department of Agriculture,—has presented a great mass of evidence on the subject of the under-water use of the wings and feet in Grebes and Loons and some other birds as a result, mainly, of a questionnaire sent by him to "accredited observers of the Division of Ornithology, and Fellows, Members and Associates of the American Ornithologists' Union." One must conclude, if all this evidence is equally reliable, that it is a matter of indifference or of individual variation whether the feet alone or the feet and wings are used by Grebes and Loons, but that the majority use their wings under water. As I have studied this matter for some years and have published a paper on it in 1909,[1] I have been interested to analyze these reports of Mr. Forbush, for their perusal leaves one, I believe, in a confused and false state of mind, and I am sure that he would be glad to have this confusion cleared away, if possible. I am inclined to think I am anticipating him in this analysis for he calls even his Department Bulletin "a preliminary report."

Before attempting this analysis, which I have limited to Grebes and Loons, one should bear in mind several general considerations. A good observer should of course have no preconceived bias towards either side in a controversy, but, in observations of diving birds, which must be made in brief and often unexpected instants, he must hold clearly in mind the possibilities, else he may see only

[1] The Use of the Wings and Feet in Diving Birds. 'Auk' XXVI, 1909, pp. 234-248.

what he expects. It is a well known fact that many birds habitually use their wings under water. This is the case with the whole family of Auks and with many Ducks, and it is a common belief among gunners and guides that all diving birds "fly" under water. Some ornithologists entertain the same idea, and it is often difficult to give up preconceived ideas. For example the idea that Hawks and Pigeons in flight hold their feet in front is prevalent even among ornithologists, although it is a well known fact, easily established by careful observation, that the feet are as a rule stretched out behind.

Mr. Forbush believes that observations of captive birds in tanks, which all show that Grebes and Loons habitually use the feet alone, are of little or no value, for, he thinks, the limited space would prevent the free use of the wings or bursts of speed. He says: "This idea that a bird in a small tank will act exactly as it would when free and in deep water has caused ornithologists to draw false conclusions." and "One might as well study the habits of an Eagle in a flying cage."

To this, three ideas are pertinent: In the first place "it is a poor rule that does not work both ways" for birds like the Auks and certain Ducks may be seen to use the wings in diving even in a small tank. The only observation quoted by Mr. Forbush that controverts this statement is one on Guillemots in the London Zoo, as follows: "When feeding time came a bucket or two of dead or moribund small fish were emptied into the tank. The birds had to exert very little effort to secure their feed, and I noticed a few did not use, or hardly used, their wings under water, but could easily secure the fish with a few strokes of the feet. The keeper assured me that when first introduced the birds all used the wings when swimming below the surface." The value or lack of value of this observation is obvious Moreover in Mr. Forbush's reports are to be found observations of Grebes in small natural tanks in rocks or in the ice where, under the psychological effect of fright, to be explained later, the wings were actively used. Mr. Forbush does not consider these of little or no value.

In the second place, captive Loons, when thrown live fish, pursue them with the greatest eagerness, entirely unembarrassed by the presence of the observer, and it is reasonable to suppose they are making their best speed.

In the third place many of the tanks are of large size, particularly the one at Woods Hole, as will be shown later.

The psychology of fright must be understood. A child that has recently learned to walk or run, returns to a quadrupedal scramble under the influence of fright. A domestic fowl may be a fast runner, but, under the influence of fright is sure to use its wings also, even if it falls over in so doing. Birds that are cornered or chased, especially if in addition they are wounded, are obviously in a state of extreme fright.

Another way in which fright interferes with the best actions of birds is illustrated by the following from a recent letter from Mr. W. L. McAtee: "I have noticed that Grebes surprised by the sudden appearance of a hunter standing up in a blind near them foolishly and hysterically try to escape by their ineffective spluttering flight, when their perfectly good method of escape by diving was entirely forgotten."

On a calm day on the Labrador coast I watched twenty or thirty Loons trying to escape from the path of the steamer by attempting to rise into the air. After an interval of fifteen seconds to three and three quarter minutes they gave up their frantic floppings along the surface and dove. Only two succeeded in rising into the air.[1] Fright inhibited their higher centers, those last evolved. They "lost their heads" so to speak. One would infer from this that flight by wings in the air is more ancient than diving in the water. The earliest bird of which we have knowledge, Archaeopteryx, was arboreal.

Finally it is evident to all who have studied the habits of birds that it is never safe to say that a bird always does so and so or that it never does so and so. Pigeons and Gulls under certain circumstances carry their feet in front in flight. To a student of evolution and of structure certain tendencies or rules of conduct are often evident, to which, however, there may be more or less exceptions, for birds, like the rest of us, are not perfect machines.

It seems to me reasonable to suppose that birds that ordinarily swim under water with the feet alone, do, when terrified, return to the quadrupedal method, especially if it can be shown that the young of these groups use this method. It is even conceivable

[1] 'A Labrador Spring', 1910, pp. 51, 52.

that the quadrupedal method may be inferior for speed purposes to the perfected bipedal method. This, however, is another question merely touched on here, but referred to tentatively in my conclusions. It deserves careful study. I do not believe that the question can be answered, as Mr. Forbush has done, by showing that the wing-surface is at least three times as large as that of the feet, that the pectoral muscles are larger than the femoral and that the wing-beats are as rapid as the foot-strokes. There are other factors to be considered.

Some of those who report that Grebes or Loons dive by the use of the feet alone speak of their great speed through the water, sometimes of their "remarkable" or "incredible" speed. On the other hand many observers appear to assume *a priori* that in order to attain great speed the wings must be used to assist the feet. This assumption may or may not be correct. Careful experimentation is needed to determine this point.

It is evident that Grebes which carry their downy young under the wing in diving, do not, at these times, use the wings for propulsion.

One more very trite remark may be pardoned, namely, that all of us have more or less uncertain memories and, unless notes are taken at the time, our remembrance of the incident may be unreliable, especially if years have elapsed. In several of Mr. Forbush's reports the words "apparently" or "as he remembers" qualify the statement and many of the observations are remote in time, one having occurred fifty-seven years before.

Mr. Forbush in his first paper likens the position of those who maintain that the wings are not used to the Negro judge who, in trying a murder case, accepted negative evidence as equally valuable with positive evidence. This is hardly apposite for the observation of a bird swimming under water with its feet and holding its wings motionless is not negative but positive evidence.

Let us now examine the evidence in these papers. Some of the reporters are scientific ornithologists whose observations are of great value, but it is obvious that among the Associate Members of the A. O. U., although many may be excellent observers, the observations of others are comparatively worthless. It is impossible and it would be invidious to separate and discard the obser-

vations of the latter class. We are obliged to take them at their face value—a disadvantage that always applies to statistics obtained in this manner. We can, however, discard or rather place among the abnormal, all observations made where the bird was obviously frightened, especially where it is wounded. These cases all run true to the form expected. The birds use their wings as well as their feet in their frantic efforts to escape from man, the destroyer.

Many of the birds in Mr. Forbush's reports were chased in boats or cornered and escaped only by swimming under the boat; or they scudded under the bridge where the observer was standing; or they were discovered in small pieces of water on calm days when they were unable to rise into the air. Many were wounded. Only under very exceptional circumstances is an observer in the open near enough to observe the actions of a diving bird without causing it fright. One can easily imagine the frantic terror of a Grebe in a small lane of open water when an observer runs near it on the ice, as it repeatedly dives in its vain attempts to escape. Mr. Forbush's evidence is of great value in showing the effect of fright on these diving birds.

Then we can view with suspicion or perhaps discard cases where internal evidence shows that the reporter was in doubt, that his memory was hazy owing to lapse of time combined with absence of notes, or where he mentions poor visibility of the bird. Some cases may be discarded at once owing to contradictory statements, as when one reports that the feet were not used and in the next sentence says he could not see the legs.

There still remain a large number of cases in Mr. Forbush's reports that are clear statements, but where, owing to the absence of details, one does not know the conditions nor does he know whether the bird was frightened or not.

To clear up these cases, I have written where it was possible to the reporters for further details, and have questioned several in person. All the answers are quoted here.

Several observers say the wings are raised a little from the body. Dr. Walter H. Scudder made careful observations on an unwounded Pied-billed Grebe, kept in a tank eighteen or twenty feet long, four feet wide and from four to six feet deep. He writes: "It

would dive straight down to within a foot or eighteen inches of the bottom, its wings close to its side, striking the water alternately with its feet in diving. Then it would suddenly assume the horizontal position, raise its wings slightly from its sides and, keeping up the alternate motion of the feet almost faster than the eye could follow, swim with most remarkable swiftness through the water, which seemed to pass under the slightly raised wings at the shoulders and come out at the tail with a swirl, much as the water leaves the blade of a turbine waterwheel. There was absolutely no other movement of the wings.

"I once observed the same manner of swimming under water at a double canal lock in Akron, Ohio, . . . a large male Loon. . . . There was no movement of the Loon's wings except the slight raising of them as he came to the horizontal, then, using his feet exactly as did the Grebe, propelled himself with great swiftness through the water."

Mr. Charles W. Vibert writes that the Horned Grebe was remarkably tame and chased live fish put in its tank. In this pursuit, "he lifted the butts of his wings a trifle, using them apparently to maintain his balance as well as to aid him in his progress."

In what way the wings used thus would aid progress is a little obscure and needs further study, but these careful observations are of very great value. The following quotation from F. W. Headley[1] as regards Cormorants is pertinent here: "The Cormorant uses his feet alone to propel him (in diving) striking with both simultaneously, and holding his wings motionless, though slightly lifted from the body. The position of the wings must have given rise to the idea, common among fishermen, that the Cormorant flies under water . . . But when you see him in a tank you can have no doubt that the legs are the propellers."

Mr. W. L. McAtee of the Biological Survey, who reports the use of the wings by a Pied-billed Grebe, writes me that the "bird was rather cornered in a narrow inlet to a pond and, on coming up and seeing me, had to reverse its course and pass me to escape. Fright may have been the cause of its using its wings."

Mr. Charles L. Phillips writes: "The bird was doubtless frightened and made an extra effort to get out of sight and danger as rapidly as possible."

[1] 'Life and Evolution,' 1907, p. 125.

Dr. A. K. Fisher writes: "Many of the Grebes I saw flying under the water were after fish and were not aware of my presence. If I remember correctly, the first ones I ever saw were in the Adirondacks where I could see them plainly because I was standing on a high bluff overlooking the water. At Klamath Falls I have stood on a bridge and watched these birds in operation in the water below."

Mr. Robert O. Morris writes that the Grebe remained in the pond "for a number of weeks and became very tame. This occurred about a quarter of a century ago and my recollection regarding seeing it under water is rather hazy, but I think it used its wings in its movements, although I saw it only once when it was under water."

Dr. T. S. Palmer writes: "The birds [Loons] were considerably frightened as they were being pursued by several boats working in parallel lines and had been driven into shallow water where they had difficulty in diving."

Mr. Ludlow Griscom writes that the Horned Grebe "was *inside* the breakers in a place where the tide had fashioned a sort of pool with a bar running seaward. . . . As a result, the breakers running up the beach were given a strong spin westward, and I always supposed that this was why the Grebe was using its wings, —the feet only might not have given sufficient power to maintain speed and exact direction. It used its wings all the time it was in this pool. It is proper to add that on several other occasions I have undoubtedly seen Horned Grebes fishing, and they did *not* use their wings, but there never were the unusual tide and current factors to contend with."

Mr. Mark Robinson studied a Loon that was so tame that it came within ten feet of him. He writes that "when hunting he would use his feet only, to swim, but when a burst of speed was necessary, the wings opened slightly, the points of wings close to the body."

In Mr. Forbush's paper there are reports from Mr. Ralph Lawson of a diving Horned Grebe, and by Mr. George H. Mackay, Jr., of diving Loons where both wings and feet were used. I questioned both of these reporters and there seems no doubt but that the birds were normal and apparently under normal conditions. There

is also the report of the careful observation of a diving Horned Grebe using its wings by Mr. Ralph Holman, but no data as to the circumstances are given. Mr. Holman tells me he had shot the Grebe and was endeavoring to pick it up from the water with a paddle, when it revived and made a frantic and effectual attempt to escape.

Mr. E. S. Butler writes of the Pied-billed Grebe using its wings: "Upon my sudden appearance directly above, it dived and swam rapidly away, evidently frightened." Mr. C. K. Averill writes he has no reason for supposing the Loon that he reported was frightened. Mr. Wright M. Pierce writes that the Grebe he observed under thin ice "was very greatly frightened—it was certainly doing its best to get away from me."

Mr. Erle L. Browne writes: "The Loon I saw was in a fish weir and naturally would be a little scared; have seen Grebes a number of times using the wings under water and think they do it naturally scared or not."

Mr. Scott Harrison Lewis writes of Grebes: "We chased these birds quite a while and finally got to see one or two 'flying' under water. The wings appeared to move in a small radius, I could not observe the feet. There was one wounded one which also used its wings upon being chased. They were undoubtedly frightened."

Mr. J. K. Jensen furnished with his careful report sketches showing the use of the wings, but in this report, as given by Mr. Forbush, there is nothing to show whether the bird was at ease or not. Mr. Jensen writes me that "the Grebe I saw using its wings under water was frightened. I came upon the bird quite unawares . . . in a small pool formed in a depression in a rock ledge. . . . The bird dived at my approach, and circled the pool several times, using both feet and wings. After a little while it brought its bill above the water for breathing, dived again . . . I do not remember how long I watched the bird, but I stayed so long I was actually afraid the bird might drown. I could easily have captured it."

In Mr. Forbush's brief transcript of the observations of Mr. A. R. Cahn on a Holboell's Grebe in a pool in the ice twenty-five feet square, one could not say whether the bird was frightened and trying to escape, or at ease and in pursuit of fish. A reference to

Cahn's complete article[1] in 'The Auk' makes the matter clear. Here he says: "When approached, the bird dove, and remained under water nearly a minute. As soon as it came up, it would dive again on the instant so long as the observer remained near . . . After having been under water almost continually for over fifteen minutes, the bird was tired out, and finally came to the surface on the opposite side of the pond from the observer. Here, it drifted nervously about, giving its peculiar squawking note every few seconds. After being watched for some time, it was driven into the shallower water, where it suddenly dove and remained down over a minute. It reappeared finally over two hundred feet away, crawling up on the thin ice through a hole which it had made with its head and bill. The bird was taken from the ice without a struggle or attempt to escape." He states that "eleven beautiful specimens" in all were picked up. The resemblance between this report and that of Mr. Jensen's is striking. Both birds were practically in tanks and both were terrified.

Mr. Albert A. Cross who reports a Loon using its wings under water writes me that he had been driving the Loon by shooting at it whenever it appeared above the water, and that his partner, coming up from the other side, drove it back so that it swam close by through the "narrows." One reporter gives only second-hand observation, but he says the Loon was not frightened.

Mr. A. L. Clark writes: "The bird was not frightened except by finding itself in the narrow confines of the bay and possibly by seeing myself and two friends on the bridge apparently cutting off escape. It is also likely that the wings were brought into use in this case because of the current in the channel."

Mr. S. B. Jewett writes that the bird was probably a cripple. "It was certainly very much frightened as I was after it in a small pool of water where it had stayed after the tide had receded."

If we exclude from these reports all observations where the birds were wounded or frightened, or where internal evidence shows that the observations were of doubtful value, the proportion of the birds using their wings is very much reduced, but their still remains a small number of reliable observations under apparently favorable circumstances where the wings were used. I have no wish to discredit this evidence.

[1] 'Auk,' XXIX, 1912, p. 440.

It is important, in all statistics where a scientific truth is sought, not only to obtain reliable information but to analyze the answers, as has been attempted here, before they are published. Entirely erroneous impressions may otherwise be given, which are doubly dangerous because so many look on statistics—not as the vulgar joke labels them—but as infallible. Another important point in obtaining facts by the questionnaire method, is that no "leading" questions should be asked. The physician, who wishes to get at the truth of a patient's symptoms, avoids leading questions, and the lawyer is forbidden to use them in the first examination of the witness. When the observer is asked: "Have you ever observed any Loon, Grebe, Cormorant or Water Turkey making use of its wings in swimming under water,"? and finds no question on the use of the feet alone, the results of the questionnaire are liable to be biassed and limited.

Practically all the observations on captive birds in tanks and pools, considered of little or no value by Mr. Forbush, show that the birds do not use their wings. There is one exception published in my paper,[1] an observation by Mr. C. Wm. Beebe who wrote me that "Grebes and Loons do (use their wings) at times of emergency to turn quickly, or get up a burst of speed."

This use of the wings in balancing or turning is illustrated in one of Mr. Forbush's reports as follows: "Mr. Arthur W. Beckford, Danvers, Massachusetts, writes that he saw a Loon swimming in a narrow salt-water stream, and using its wings when followed by a power boat. Quick, short strokes were employed, but he believes that the wings were used more for the purpose of turning than for progression." This bird seems to have kept its head even when chased!

The pool where a tame Loon was studied in the New York Aquarium by C. H. Townsend was twenty-eight feet long and three feet deep. The tank at the Marine Biological Laboratory at Woods Hole is an outside enclosure or pool through which the tide freely flows. It is sixty feet long, thirty feet wide, and five feet deep. It is crossed by a bridge near one end from which observations can conveniently be made.

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[1] *loc. cit.*

In Mr. Forbush's second paper he quotes Professor Lynds Jones, who watched a Loon in this tank in 1904 that "never used its wings in swimming, although it swam with incredible swiftness." He also quotes Mr. Winthrop Sprague Brooks who "asserts that years ago he saw a Loon in a tank at Woods Hole, and that, as he remembers, it used its wings exclusively under water."

Mr. S. C. Brooks of the U. S. Hygienic Laboratory at Washington, while working at the Woods Hole Laboratory last summer, made some careful observations on a Loon in the tank. I quote from his letter to me of January 28, 1923: "After some days the bird became so tame as to accept food from the hand . . . he swam under water wholly with his feet . . . His usual food was *Fundulus heteroclitus*, the killifish . . . We sometimes threw in a fish and watched him chase it. I do not remember having seen him use his wings in any way in this process, unless possibly rarely opening them a little as he turned; certainly never in any way for propulsion."

It seems to me that careful observations such as these of birds in tanks, far from being of little or no value, are of the greatest value, for the birds are entirely at their ease and are not terrified by the presence of man as is generally the case in the open. Similar observations have been made by Beebe, C. H. Townsend, Evans, Lloyd Morgan, Lea and Headly.

A zoologist reconstructs an entire animal from a few bones. Not only that but he is able to describe its habits, whether, for example, the animal was a slow or fast runner, a climber of trees or a diver. If one compares the skeleton of a Penguin with that of a Loon, it is apparent that in the Penguin the fore limb is modified for locomotion under water, in the Loon the hind limb. The paddle wings of the Penguin can not be used for flying in air. The powerful legs of the Loon are set so far back as to be useless for walking on land. One would infer that the Penguin habitually used the wings, the Loon the feet, under water, but he would be rash to state that the Penguin never used the feet alone or the Loon the wings alone.

The most extreme case of specialization in the use of the feet alone in diving is that of Hesperornis of the Cretaceous period. Here the wings, which must have been a hindrance rather than a

help in diving, are reduced to vestiges, but the feet are large and powerful. The close resemblance in the pelvic girdle and the posterior extremities of Hesperornis and those of the Loon and Grebe are marked.

As Mr. Forbush does not refer to my paper[1] or observations, I may be pardoned for quoting briefly from its conclusions, which, to my mind, are confirmed by his evidence:

"It is possible that the occasional use of the wings observed in these birds (Grebes and Loons) may be explained by fright, which causes them to 'lose their heads,' and return to a reptilian scramble so to speak . . .

"In conclusion the following tentative inferences from these preliminary studies may be set down.

"1st. That progression by both wings and feet under water in diving birds is the primitive method, and is therefore to be looked for in beginners and young birds.

"2d. That specialization towards the use of the wings alone leads to a diminution in the size of the wings, and finally to a form of bird that is flightless in the air; for wings of flipper proportions, too small for aerial flight, are more efficient than large wings for subaqueous flight, as witness the Great Auk and Penguins.

"3d. That specialization towards the use of the feet alone is probably best adapted for the most rapid progression under water, and this method may leave the wings undiminished in size for use in the air. The apparent exception, Hesperornis, with powerful feet but wings degenerated to vestiges through disuse, serves but to confirm the inference of the superiority under water of feet action alone."

Finally, as a result of my former studies and of this analysis of Mr. Forbush's reports, I would conclude:

1st. That the structure and evolution of Grebes and Loons point to the use of the feet in diving.

2d. That observations under normal conditions show that as a rule the feet alone are used, although under some conditions the wings are slightly raised and in a few cases they are used vigorously.

3d. That in swift currents and in quick turns the wings are often used.

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[1] *loc. cit.*

4th. That in case of fright, especially if the bird is wounded, the use of both wings and feet is the rule.

5th. That young birds habitually use both wings and feet.

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SOME NESTINGS OF THE CRESTED FLYCATCHER.

BY JOHN A. GILLESPIE.

Plate VI.

IT was my privilege during the present year to study intimately the nesting of the Crested Flycatcher (*Myiarchus crinitus*) and as my birds nested at a height of only four feet three inches from the ground, whereas most authorities give six to twenty feet as the usual nesting height, it seems worth while to place my observations on record, especially as the birds displayed a confidence in mankind both in selecting a nesting site and in their subsequent actions which seems unusual. This nest was located in a piece of hollow fence post about four and one half inches in diameter and twenty inches in depth—which I had nailed to the side of the house and which projected out at right angles therefrom. The purpose of the post was to serve as a food shelter and retreat for winter birds, and the possibility of its being utilized for a nest had never entered my mind. The construction of the nest took about ten days. Fine grasses and weed stalks were chiefly used. A piece of waxed paper was temporarily placed at the entrance to the nest by the Flycatchers, but was dispensed with five days later, when a piece of snakeskin some ten inches in length was substituted. This snakeskin was not in evidence when the nest cavity was examined subsequent to the leaving of the fledglings. As no trace of it could be found outside the cavity, the nest proper was examined and minute particles were found therein. As the weather was unusually hot at this time, the snakeskin no doubt became very dry and brittle, and was broke into smaller and smaller pieces, due to the resulting friction as the female came and departed. The sexes could be distinguished with ease as the male carried his crest erect while the female did

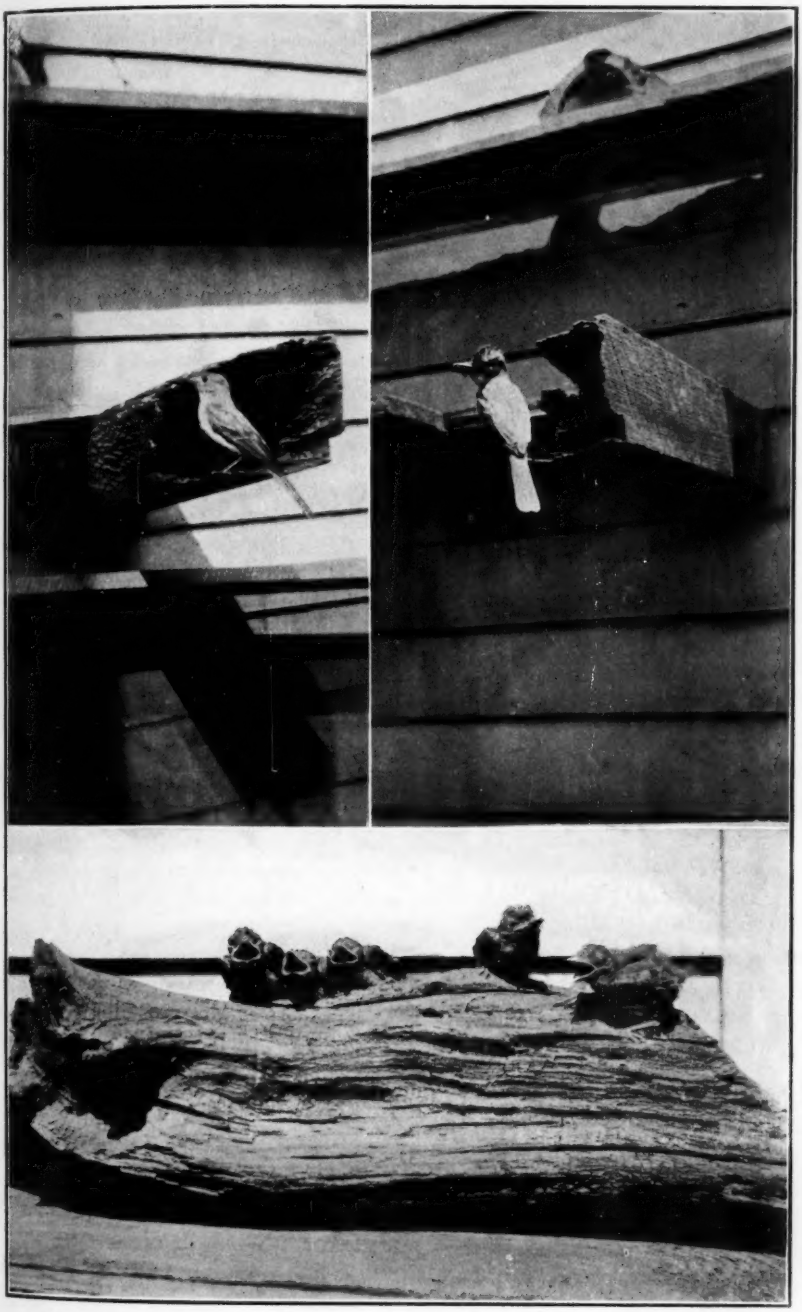
not, as can be seen from the photographs. The bringing of materials and nest building were practically all done by the female, and four days after its completion the full complement of five eggs had been laid. Thirteen days later four eggs hatched and the following day five young Flycatchers were calling for food, which consisted of large flies, dragon flies, large and small, but invariably those with wholly transparent wings, small butterflies and moths, species undetermined, caterpillars, grasshoppers and katydids; white mulberries, and small winged insects—species undetermined.

These observations were made from a window not five feet from the nest, shielded by a curtain through which it was easy to see and not be seen. The feedings commenced at 4.30 A. M. and the latest feeding observed occurred at 7.12 P. M. Both female and male brought food in the proportion, I should say, of two to one. The excreta were removed by both adults, and once the female was seen to snatch up a portion before it touched the cavity floor in typical flycatcher style. Fifteen days after hatching, all five fledglings left the nest, flying for the first time in a direct and unwavering manner. It is interesting to compare this flight, of a species soon to be dependent on its wings for food, with that of the Robin or Catbird, largely ground feeding birds, whose initial flights are usually uncertain and of limited distances. The initial flight of one fledgling Crested Flycatcher was at least seventy-five feet. Small bushes and young trees were in his direct path, but he elected to land in a tall red maple, about thirty feet above the ground.

One fledgling left the nest early in the morning and consequently only four were banded. The following night a severe thunder storm occurred, and if this instance can be taken as a criterion, the fledgling mortality among birds, from this particular cause, is nil, for all five could be accounted for, in the woods nearby, the day following the storm.

On July 4, they declared their liberty! And at the present writing, three weeks later, a pair of them, now apparently fully grown, paid us a brief visit, proudly displaying their shining bands.

After recording my observations as above I learned that Mr. H. Walker Hand of Cape May, N. J., a fellow member of the



1. FEMALE CRESTED FLYCATCHER AT NEST.
2. MALE BIRD. NOTE DIFFERENCE IN CREST.
3. YOUNG CRESTED FLYCATCHERS, REMOVED FROM NEST.

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Delaware Valley Ornithological Club, had been studying a nesting pair of Crested Flycatchers and his observations, made entirely independently, corroborate mine in a most interesting manner, while he has added some other facts of importance. He has kindly allowed me to include in this paper a summary of his experiences.

Last spring he erected a small box $4 \times 4 \times 10$ ins. with a round hole for entrance, hoping to attract a pair of House Wrens, but to his astonishment a pair of Crested Flycatchers took possession about the middle of June and began to build, the late date indicating a second nesting or a case where the first nest had been destroyed. The female seemed to carry all of the nesting material, and constructed the nest, although the male accompanied her to and from the box with great regularity. The sexes could easily be distinguished, by the fact that the crest of the male was always elevated, while that of the female lay flat, just as I had observed in my pair.

The eggs hatched on July 3 and one young bird was seen to leave the box on July 28, flying directly from the hole to a tree some distance away with perfect confidence and with none of the short flights of the usual fledgling. It called, too, in exactly the same pitch as the parent. How many young were raised he is not sure. During incubation the male fed the female and would lean in at the hole, but about dusk he invariably left the neighborhood of the nest, going elsewhere to roost. After the young hatched the female also seemed to leave for the night. Both birds fed the young, the female often entering the box and remaining for some minutes, and standing in the entrance hole, looking about in all directions. The male, however, departed at once. When he fed the young he lit on the edge of the hole and, leaning over inside, brought the upper surface of his tail up flat against the outside of the box. The birds caught many small moths and butterflies as well as other insects, and an inspection of the nest after the young had left showed the hard shell of the abdomens of five cicadas.

Further inspection disclosed the presence of ventral scutes and other fragments of a snakeskin which had been broken up evidently by the activities of the young. The nest consisted

mainly of pieces of dry grass and a quantity of cowhair and formed a dense mat two or three inches thick covering the bottom of the box.

This nest box was located eight feet up on a telephone pole close to a garden fence where members of the family passed frequently. Mr. Hand was there most frequently and the birds seemed to show especial confidence in him, going to the nest within a few feet of his head, though they showed practically no alarm at the presence of anyone in the garden.

Mr. Hand also tells me of a nest that he watched some years ago which was built in an old wooden pump, propped against a house, the birds going in and out through the hole where the handle operated.

Glenolden, Pa.

THE KIRTLAND'S WARBLER IN ITS SUMMER HOME.

BY N. F. LEOPOLD, JR.

Plates VII-VIII.

DURING the spring of 1922, it was my privilege to work under Mr. Norman A. Wood of the University of Michigan Museum, the discoverer of the breeding range of Kirtland's Warbler, and at his suggestion I determined to make a trip to the region where he had discovered the type nest and egg of the species. Consequently on June 24, 1922, in company with Mr. James D. Watson of Chicago, I started in my automobile bound for Luzerne, Oscoda County, Michigan.

The first night was spent at Pentwater, Michigan, at a distance of about 280 miles from Chicago, and at noon of June 25, we arrived at Traverse City. From this point it was necessary to strike due east across the state over well-nigh impassable roads, and as a result we were compelled to spend the night at Grayling, still at some distance from our destination, but at least in the same character of country in which we expected to search for our bird. Needless to say we were constantly on the lookout for unfamiliar songs and birds, but although we traversed many suitable stretches

of jack-pine we were unable to discover any trace of the Warbler. On June 26 we left Grayling and went, via Roscommon, to the little town of Luzerne, on the banks of the Au Sable. Here we were fortunate enough to discover that Mr. George A. Hickey was the proprietor of two one-room log cabins which he rented out to fishing parties, and which were situated on the north bank of the Au Sable about 8 miles north and east of Luzerne, and within a few hundred rods of Mr. Parmalee's home where Mr. Wood had secured specimens in 1903. At this point then we decided to make our headquarters.

On the afternoon of the 26th we started out from our cabin (graced by the name of Buckhorn Lodge) and worked west past Mr. Parmalee's house. However, we saw no sign of the bird either then nor during our entire stay. The reason for this failure may be looked for chiefly in the change in the character of the country which had taken place since Mr. Wood's expedition. One of the peculiarities of *Dendroica kirtlandi* as we afterwards learned, is that it nests entirely in jack-pine from five to twelve feet in height. Consequently, the very trees which twenty years before, at the time of Mr. Wood's expedition, had offered ideal nesting sites for the Warbler, had by the time of our arrival attained a much greater height, and were no longer a likely home for the bird. Further, as we later learned, the area had been swept by fires which doubtless also had their effect. We remained in the neighborhood five days, working in both directions, and on both banks of the river. Then we drove to the North Branch of the Au Sable where Mr. Wood had also found the bird, but here, too, we were unsuccessful. Therefore on June 30 we left the area, driving north to Charlevoix, and thence home.

Later in the summer of 1922, I learned from Mr. Wood that in driving to Alpena, Alpena County, on the Lake Huron shore, he had run across another sizeable colony of the birds near Oscoda, Iosco County, and also knew of another colony near Higgins Lake, Kalkaska County: whereas the late Dr. Barrows of the Michigan Agricultural College had discovered a colony, near the little town of Winterfield, in the extreme northwestern corner of Clare County. It would seem then that all the known breeding colonies of the bird lie in a belt about fifty miles in breadth stretched

across the State of Michigan from Traverse City on the west to Oscoda on the east.

In the spring of 1923, I again determined to visit this region, and if possible, make a study of one of the breeding colonies. However, after the failure of the previous expedition, I decided this year to arrange matters differently. First I planned the trip for a week earlier than the previous year, and second I allowed myself enough time to visit all the known colonies if necessary. Consequently at 5:00 A. M. of the 16th of June, 1923, I started from Chicago in company with Messrs. James Dewey Watson, Sydney Stein, Jr., and Henry B. Steele, Jr., all of Chicago, bound for Oscoda, Iosco County.

After a long drive the first day out we reached Bay City on the Lake Huron shore, just 100 miles south of our destination, and spent the night there. June 17 we started off again, and at noon arrived in Oscoda. Here we found an excellent hotel, Van Ettan Lodge on Van Ettan Lake, about two and a half miles north of Oscoda. According to the instruction which Mr. Wood was kind enough to furnish, we started off at 12:30 P. M. to drive to Foote Dam on the Au Sable River and about seven miles from the lodge. We drove north about three quarters of a mile on M-10, the state trunk line, and then turned due west over a little sand road leading to Foote Dam. Hardly had we driven 500 yards on this road when Mr. Stein called our attention to a song which was unfamiliar to all of us, and we got out of the car to investigate. We fought our way several hundred yards through extremely dense jack-pine when Mr. Watson and the writer simultaneously caught a view of the singer perched in a large pine tree. The bird turned out to be a fine adult male *D. kirtlandi* in full nuptial plumage. Perhaps the most striking feature of the song was its great carrying quality. The bird perches on a limb, every muscle in his body tense, points his head toward the sky and lets out a burst of clear, bubbling song, easily audible at a distance of a quarter mile. In singing, so much effort and vigor are put forth that the tension of the jugulum and throat is very noticeable and it seems as though the singer's throat will burst from the sheer force of the song.

According to the descriptions of the song, we expected a clear, Oriole-like whistle,[1] but neither on this occasion, nor during our entire stay, was any member of the party able to detect anything suggesting the Oriole. As we heard the song it seemed extremely Wren-like, combining the bubbling quality of the song of the House Wren with clear, sharply defined syllables.

After watching this first male for some twenty minutes, we resumed our trip west toward the river, our object being to locate more or less definitely the limits of the colony. For about three-quarters of a mile farther, we were greeted by the cheery song, coming from both sides of the main road. Here, however, the nature of the region changed, and although we continued all the way to the river, no more birds were heard. On our return we stopped and studied a few more singing males and then returned to our hotel.

June 18, we were in the field at 5:00 A. M. We first returned to the site of our first bird and spent several hours attempting to locate his nest by watching his movements. This bird was one of the few which were never observed with food in their mouths, and although we saw several other birds, some perhaps females, we were entirely unsuccessful in finding his nest, and decided to explore further. Consequently we struck due east and found a sizeable colony at a distance of about a mile in similar jack-pine growth east of M-10. Here we divided into pairs and spent the morning in attempts to locate a nest and in studying the habits of the bird generally. It appears that each male has a favorite perch, generally a dead branch of some description on a tree somewhat taller than the surrounding short jack-pine and to this he returns both before and after feeding, to sing. After a short sally forth the male returns to this perch holding food in his mouth and here lets forth his wonderful ringing song. Sometimes he will sing thus as long as thirty-five minutes, holding the food securely in his bill, before he goes to feed the young. According to Mr. N. A. Wood, in his pamphlet on the 'Discovery of the Breeding Area of the Kirtland's

[1] Eliot Blackwelder, 'Auk', XVI, p. 359, describes the song as Oriole-like, as also does N. A. Wood, in 'Discovery of the Breeding Range of the Kirtland's Warbler.' Rather the best published description of the song is that of Edward Arnold, 'Auk', XXI, 487, who describes it "*irp, irp, terp, terp, terp, serkwit, er, wer,* all but first two notes uttered rapidly." He also mentions shorter songs.

Warbler', the bird sings about once every 30 seconds or at even longer intervals. According to our observations, however, made with a stop watch, the bird sang with the utmost regularity between six and seven times to the minute; in other words, about every eight seconds, each song lasting about a second and three-quarters.

One peculiar habit of the bird when he has returned to his perch after disposing of his food is distinctly sparrow-like. He perches on his branch, casts a look about in each direction, and then carefully strikes or whets his bill on the branch, first on one side, then on the other. This, together with his bill, much larger than in most of the Warblers, reminds one very strongly of the Finches.[1]

After spending the morning in making general observations and attempting to syllabize the song (which will be given later), we returned to the hotel to dinner.

At about 1:30 P. M. we returned to the original site, and walked west toward the river. When we had gone about a quarter of a mile we discovered another singing male, and while Mr. Watson was walking through the pine attempting to get a look at the bird, he started a female from the ground about two feet from where he was standing. The bird half flew and half hopped a few feet, and then hopped slowly into the shrubbery, dragging one wing as though it were broken. This so-called broken wing ruse is, of course, common enough among many other birds, notably the Meadowlark, but to my knowledge has never been observed before in the case of the Kirtland's Warbler. The male in the meantime was perched in a clump of low pine trees where he was chipping excitedly and wagging his tail very much after the manner of the Palm Warbler. As we afterward had occasion to learn, both birds chip only when nervous, and flit their tails when nervous or attempting to decide on the next move.

We were convinced that the nest would be found in this immediate vicinity, and after a few moments' fruitless search, decided to post ourselves at three different points where we could command the entire vicinity, and await developments. The spot was located

[1] Blackwelder. 'Auk', XVI, p. 359, mentions that the bird appears un-Warbler-like because of its habit of staying for some time in one place. This habit seems to me only slightly more pronounced in the case of *kirtlandi* than with certain other Warblers during the breeding season.

KIRTLAND'S WARBLER AND NEST.
(From Motion Picture by James McGillivray Courtesy. Dept. of Conservation of Michigan.)

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about twenty yards south of the main road, and separated from it by a rather thick growth of pine. There in the midst of a more or less open area was located a thick clump of jack-pine, ranging from six to twelve feet in height, and composing a circle with a radius of perhaps ten feet. It was in this clump that both parent birds took their stand, hopping nervously from branch to branch, chipping and flirting their tails. The male held a small caterpillar which we took to be a span-worm in its mouth. After about twenty minutes of nervous flitting about the male dropped to a small twig on the ground about twenty feet to the northeast, but reappeared almost immediately with the food still in his bill. After about twenty-five minutes more the male dropped to the ground at a point almost directly in the center of the little clump and reappeared after about a minute and a half, having disposed of his food. We decided that this must be the location of the nest, and so, crawling on my hands and knees, I started to make a minute examination of the ground.

The ground which is sandy but covered with a thin layer of black earth, is thickly overgrown with a mat of evergreen and ferns of various kinds and is so thickly strewn with branches, pine cones and other debris as to make very difficult the finding of the nest. However, after I had advanced a few feet, I flushed the female who had been concealed but a few inches from my hand, and on careful examination found a nest containing four young about three days old. The nest was very completely concealed; a branch, about half an inch in diameter being directly over it, and a mass of vegetation, living and dead, covering it almost completely. The parent birds were flying about very close to me and seemed much perturbed; so, after marking the tree, we decided to return to the hotel in order not to disturb the birds further.

June 19, we determined to spend the morning making a study of the habits of the bird at the nest. Consequently we started out about 9:30 A. M. and arrived at the site of the nest at 9:45. We divided into two parties, each taking a turn at observing the nest and taking notes of the proceedings. Mr. Watson and the writer were to have the first turn, consequently we approached the nest from the southeast, and concealed ourselves on the ground at a distance of four to five feet from the nest. I quote from our notes, taken at the time.

Arrived at nest at 9:45 A. M. After difficulty in discovering nest, flushed male from its side. He flew about four feet to a small jack-pine and eyed us suspiciously for a moment—then burst into song. Moved closer to nest, with a bug in his mouth, watching us and singing. Female sat on a bush at a distance of 15 feet, chipping and wagging her tail. Male seemed at ease—the female not at all. Male sang—

chip, chip,—chip, chip, chip,—chip, chip wheeou
crescendo piu accel.
accelerando

9:50—Male moved nearer nest, singing six times a minute. Head always raised in song. Movement of throat very noticeable. Female flew nearer into same clump. Food held tenaciously in mouth of male for fifteen minutes during song.

9:57—Male fed young. The young birds have not made a noise.

10:06—Male hopped from nest, looked about an instant and commenced singing.

10:09—Male left clump (in search of food), and flew to a neighboring tree at a distance of thirty feet, where he sang.

10:13—Male reentered clump with food, *singing.* Approached nest as before and fed.

10:14—Seems much less shy. This time stayed only 45 seconds before reappearing, having disposed of his food. As before, remained in clump singing for several minutes before departing in search of food. Female chipping much more softly and much less frequently. Seems to have become accustomed to our presence. Female wags her tail *much* more frequently than male.

10:24—Male approached within two feet. Not at all suspicious singing. Has two alarm notes, one slightly softer than the other. Female approached within a foot of the nest and then withdrew, wagging tail continually. Also circles around watching us very intently.

10:29—Female within six inches of nest, with food.

10:33—Male in bush to right of us, singing. Female keeps coming within six inches of nest, withdrawing each time. She wags her tail much more than male.

10:38—Male enters nest. Immediately leaves. Female also enters nest after watching male. Also leaves immediately.

10:41—Female enters nest. She has been within six inches of the nest twenty-eight times before entering for the first time.

(Relieved by Messrs. Steele and Stein.)

10:50—Female just approaching nest. Very nervous. Tail wagging continuously.

10:55—Male approaching as female nears nest with food. Male has food too. He is much less nervous and feeds young; then leaves while female is still inspecting surroundings.

10:57—Male still singing on stump nearby.

11:00—Female still carrying food. Has approached nest twice but not fed young yet.

11:03—Female still hopping about. Six trials so far and has not fed young yet. Seems to have a very definite route by which to approach the nest.

11:04—As male approaches, female drops into the nest to feed but comes out three times during the process to look about.

11:07—Female within four feet of us for inspection, male nearby singing. Exchange positions. Female off for food. Male sings as he approaches nest with food.

11:09—Female returns. No food, however. Male feeds. No elaborate performance, goes directly about his business and at

11:11—leaves nest, after feeding.

11:14—Male singing about two feet directly above the nest. Sings eight times a minute.

11:15—Male much interested, female scared by noise occasioned by changing film in camera. Male approaches boldly within three feet and sings, while female hops about nervously.

11:17—Female left and returned with food. Male singing. Female resumes same tactics to feed.

11:20—Accidentally snapped a twig and female left. Male not even disturbed. Food seems to be a long black worm, shiny like a centipede.

11:26—Male singing loudly in back of us, then approaches directly over our heads. Apparently oblivious to us.

11:27—Female has not returned.

11:30—Length of song, one and a half to two seconds. Still singing 7–8 times a minute.

Female caught food on wing.

June 20, 1923.

At about noon we went to the town of Oscoda and here chanced to meet Mr. James McGillivray of the State Conservation Commission. Upon telling him of our find he readily assented to photograph the bird at the nest. It was decided, however, that conditions for photography were rather unfavorable at the site of the first nest, and as the sky was overcast and the light poor, we thought it better to spend the afternoon searching for another nest more adapted perhaps to photography.

We started out therefore at 2 P. M. and drove to a point a few hundred feet east of location of our first nest. Hearing a singing male a quarter of a mile to the south, we went in search of the bird, and were fortunate in finding the character of the country much more open than in the previous case.

Our bird proved to be singing with food in his mouth, on the dead branch of a tall pine tree, but again near a clump of small jack-pine. We sat at a distance and observed the male make several flights to the ground, but each time in a different direction. However, after a time he did twice go in the same direction—thus giving us a clew as to the approximate location of the nest. After about twenty minutes of watching the bird from a distance, we had localized the nest as being situated in a clump of jack-pine about three times as large in area as that which harbored the first nest. With this information we made a closer approach and surrounded the clump completely, lying on the ground awaiting developments. This male seemed considerably more nervous and agitated by our presence than was the first. So much so, that he sat on a perch for thirty-five minutes holding food in his bill. For about the first ten minutes he twitched his tail continually, chipped at short intervals, singing only infrequently. Thereupon he became more composed, the chipping decreasing in frequency and the song increasing. An interesting observation at this point was that before deciding to fly to another branch, the bird looked about in all directions and twitched his tail vehemently. This was so noticeable that one might really be able to guess the state of the bird's mind by the amount of twitching of the tail.

After about twenty minutes the male finally became partially accustomed to us and started hopping in the form of a rough square

FEEDING THE KIRTLAND'S WARBLER AT THE NEST.
(From Motion Picture by James McGillivray, Courtesy Dept. of Conservation of Michigan.)

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from tree to tree. Still we were afraid to move, for at a false motion on the part of any of us, the male assumed absolute rigidity as birds often do when they sight a hawk. As a twig cracked, he cowered absolutely motionless at a distance about four or five feet from us and on a level with our eyes. Then, after several moments, he returned to his original perch, sang, looked about, and after a last reconnoitre finally dropped to the ground at the foot of a small jack-pine. Crawling on our hands and knees we approached within a foot of the tree. The female finally flushed from the site of the nest but stayed so close to us that she might easily have been caught alive in the hand by any of us.[1] In fact, during the whole afternoon neither parent ever went further than four or five feet from the nest, chipping incessantly while we made careful blazes in order to locate it.

The nest contained two fledglings, one very small with eyes closed, the other much larger and with eyes opened. The latter we later ascertained to be a Cowbird. After marking the tree, we retired in order not to disturb the family. In this case as in the other, the nest was very close to one of the sand roads which crisscrossed through the jack-pine. This observation holds true so far as I know also for all the birds observed by Wood and Barrows. In fact, one might name this bird the "Road-side Warbler."

June 21, 1923.

After locating nest number two yesterday, we made arrangements to meet Mr. McGillivray at 9:00 o'clock. We called for him and took him to the site. It was necessary to remove two small jack-pines and sundry other small foliage in order to permit the sunlight to enter the nest. We found beside the two nestlings one large speckled egg, probably a Cowbird egg. The birds were surprisingly tame, not even particularly disturbed by the sawing of trees, clearing of the site in general, or by the setting and leveling of the motion picture machine. We spent the entire morning taking pictures of the young ones and parents feeding. As in the previous case, the female was very timid, feeding only once in two-and-a-half hours. By one o'clock, we decided to remove the young Cowbird as it was getting all the food and crowding

[1] Arnold, 'Auk', XXI, p. 487, made same observation. Female was a close sitter and might easily have been caught.

the young Kirtland's. We did this and then returned to the hotel for lunch.

On our return at about one-thirty, there was no sign of the parents for the first half hour. Finally the male approached, singing, but made no attempt to feed. He seemed however, to be quite at ease. Being a little alarmed at the lack of attention of the parent, we decided to take matters in our own hands and feed the young bird ourselves. Consequently, we caught several of the large horse-flies which, unfortunately, are extremely abundant. Taking one of these in my right hand and lying down on my side at the nest, I succeeded in feeding the nestling two flies very much to his satisfaction. During this operation the adult male approached very near me and scrutinized me carefully, apparently not alarmed as indicated by the infrequent twitching of his tail.

At Mr. McGillivray's suggestion I lay very still and extended a fly held between the fingers of my left hand slowly toward the bird. To my great surprise after about two or three approaches and withdrawals, the bird perched on a twig within a few inches of my hand and snatched the fly, which he ate. I lay very still, and after a short time the bird became quite accustomed to me. Apparently he took this as an easy way of securing food, for he ate in all seventeen flies in this manner. Even more, he perched on my shoe, once on my thigh and again on the tip of my shoe. Mr. McGillivray meantime was attempting to photograph the proceedings and took in all twelve exposures of the incident. However in order to focus properly it was necessary to tilt the camera at an abrupt angle, and, due to some fault in one of the parts, eleven of the exposures were spoiled, due to buckling of the film.

During the whole day the female flitted about at a short distance, apparently trying to screw up her courage to the point of enjoying the free repast. However, at no time would she venture close enough to feed. The male rapidly learned to perch on a particular dead twig when coming for his flies, and soon appeared irritated when we were unable to supply flies fast enough. He appeared to have an insatiable appetite. At about four o'clock the light became too bad for work, and we retired.

June 22, 1923.

We were forced, much against our will, to leave the area. We drove north to Alpena and down the west side of the state along the Lake Michigan shore, and although we passed any number of apparently ideal locations, we did not hear another individual during the entire trip.

Afterward heard from Mr. McGillivray, who continued to observe the nest, that after two days someone had discovered the nest and carried off the egg and fledgling.

GENERAL NOTES.

The Kirtland's Warbler was named in 1852 from a specimen collected in 1851, but, although specimens had been taken in its winter range, namely the Bahamas, and a few occasional migration records were turned in from the United States, its breeding range was not known until 1903 when it was rather accidentally discovered by Messrs. E. R. Frothingham and T. G. Gale, who took the first summer specimen near Luzerne, Oscoda County, Michigan.[1]

Mr. Norman A. Wood, commissioned by the University of Michigan Museum, immediately went to the site and made an excellent study of this, the first known breeding colony of the Kirtland's Warbler, where he collected the type, nest, and egg.[2]

Since that time three other colonies have been located: one visited by the writer, the other two (as I have said before) in the western part of the state, one in Clare County and the other in Kalkaska County. In all these areas the bird nests exclusively in jack-pines from four to ten feet high.[3] The ground floor is

[1] Frank M. Chapman, 'Auk,' XV, p. 289, states that in 1898 nineteen specimens had been recorded from the United States and fifteen from the Bahamas. The nesting range and eggs were unknown. Several migration records had been reported from Michigan, Illinois, Missouri, Ohio, and Minnesota. Chapman sums up in this article all the information to 1898. Widmann had observed the wagging of the tail and likened it to the same habit of *Dendroica palmarum*. He also compared *Dendroica kirtlandi* to *Oporornis agilis* because of its sneaking habits. The song is described rather indefinitely by Walter Hoxie although he did notice that there were two low introductory notes.

[2] Discovery of the Breeding Area of the Kirtland's Warbler—N. A. Wood.

[3] The only published record of a nest of *Dendroica kirtlandi* anywhere but under a pine tree is that of Edward Arnold, 'Auk,' XXI, p. 487, who notes one nest found under an oak. He says that the vegetation was very heavy and the nest extremely well concealed as is the case with those nests found under pines.

covered by a heavy growth of wintergreen, ferns and creepers. The nest is built on the ground, generally not more than a foot from the base of a jack-pine. A remarkable characteristic of the bird is that no nest yet discovered (to my knowledge) has been more than a few hundred yards distant from some road. While the male may sing while perched on a tall tree, no nest has been found at any other place than in the midst of a clump of small jack-pine. The nest is always well concealed and covered over by vegetation and debris. It is sunk in the ground about two inches, is almost perfectly circular and about two inches in diameter. It is made of fine twigs and grass woven together in a compact whole. The number of eggs is generally three or four. In its actions the bird is rather slow and deliberate, often decidedly Finch-like[1]—the most noticeable example is the whetting of the bill on a twig, as mentioned.

In song every muscle in the bird's body seems to be tense, the head and neck are stretched upward pointing almost directly to the sky, the tail is stretched down and the whole body inclined forward. So vigorous is the song that the expansion and contraction of the throat are noticeable even from some distance. The bill is open wide, it being remarkable that food can be retained therein during song. The song consists generally of 7 notes. The first two are low and throaty, serving as an introduction. Then follow three high, clear crescendo notes, which form a second phrase. Then another set of three, even higher and more rapid, the last being a slur either upward, or up and down again. The quality is very Wren-like, and the song has tremendous carrying quality. Ordinarily, the syllables may be written "*chip, chip—chip, chip, chip—chip, chip, wheeou.*"[2] Of the numerous variations the following are the more important. In the first place, instead of two introductory notes, there may be but one followed by a pause or hesitation. When the observer is at a distance these notes may easily be overlooked because of their low, throaty quality. When the bird is nervous he may commence his song but may stop after

There are in all of the suitable areas of jack-pine a few small scrub oaks and it would seem likely enough that an occasional nest might be found at the base of one of these rather than a pine.

[1] Cf. Blackwelder, 'Auk,' XVI, p. 359.

[2] Cf. Arnold, 'Auk,' XXI, p. 487.

any number of notes have been sung. The last or slur note is always rising in scale but it may end at its highest point or may drop several tones. I should say that the highest note of the song is approximately a tone and a half higher than the last, the latter being at a very high pitch. So much force and vigor are used in the song that the tail of the bird indicates muscular vibration, apparently entirely involuntary and completely distinct from the voluntary wagging.

It has been said that the bird walks a great deal,[1] much as the Ovenbird. This, according to our observation, is not accurate.[2] The commonest means of locomotion, even on the ground, is by hopping, and the bird was seen to take only a very few steps during our entire stay. The female keeps the nest absolutely clean, removing all pellets and other debris either with her bill or her feet. Apparently, they eat the egg shell as no traces thereof were discovered at either nest site.

The food consists largely of centipedes, worms, and caterpillars. However, the birds also eat deer and horse flies, grasshoppers, crickets, white and dusky millers, with relish, the reason for their rather inconspicuous place on their menu being, apparently, the difficulty of capture. The birds also eat or drink the white pitch-like fluid which exudes from the branches of the pine. When nervous, the female pecks at the branches of small trees in an irritated manner. The birds chip most and also twitch tails most when excited. Consequently, these are more common traits of the female than of the male.

So far as I know these two nests are the fourth and fifth known to science.

It has long been a subject of speculation why the Kirtland's Warbler which raises as large a brood as most other Warblers, and which apparently has no more natural enemies than the other Warblers, should continue to be so extremely scarce. I suggest as a reason for this the fact that the bird is largely preyed upon by the Cowbirds (*Molothrus ater*). Wherever we saw a singing male Kirtland's there were a number of Cowbirds perched about in the tall dead trees, apparently in quest of the same thing for which

[1] Wood: 'Discovery of the Breeding Area of the Kirtland's Warbler'.
[2] Blackwelder, 'Auk,' XVI, p. 359, makes the same observation.

we were looking. I am afraid that our first nest represented the exception, and the second where there was but one baby Kirtland, a baby Cowbird and a Cowbird's egg, the rule. It seems that the Cowbird had disposed of three or four baby Kirtland's which must have been in the nest originally. This seems the most plausible explanation.

According to comparative estimates made by Mr. Wood last year, and ourselves this year, the bird is decreasing in numbers. It is greatly to be feared that *Dendroica kirtlandi* may soon be another of the American birds on the extinct list.

I do not think it out of place here to make a brief mention of the predominant flora and fauna of the immediate region in which our colonies were found. The commonest tree by far was the jack-pine. Besides this there were some white and Norway pine, a few yellow oak and a few aspen. The commonest shrub was the wintergreen, although there was also a great deal of blueberry, squawberry and partridge berry. The commonest birds in the immediate area were the Cowbird (*Molothrus a. ater*), Vesper Sparrow (*Pooecetes g. gramineus*), Chipping Sparrow (*Spizella p. passerina*), Slate-colored Junco (*Junco h. hyemalis*), Towhee (*Pipilo e. erythrophthalmus*), Brown Thrasher (*Toxostoma rufum*), Wood Thrush (*Hylocichla mustelina*) and Bluebird (*Sialia s. sialis*). We also found, but in far fewer numbers, the Broad-winged Hawk (*Buteo platypterus*), Sparrow Hawk (*Falco s. sparverius*), Nighthawk (*Chordeiles v. virginianus*), Kingbird (*Tyrannus tyrannus*), Olive-sided Flycatcher (*Nuttallornis borealis*), Wood Pewee (*Myiochanes virens*), Blue Jay (*Cyanocitta c. cristata*), Crow (*Corvus b. brachyrynchos*), Meadowlark (*Sturnella m. magna*), Goldfinch (*Astragalinus t. tristis*), Song Sparrow (*Melospiza m. melodia*), Black-throated Green Warbler (*Dendroica virens*)—common wherever taller pine trees were present, Pine Warbler (*Dendroica vigorsi*), House Wren (*Troglodytes a. aedon*), Chickadee (*Penthestes a. atricapillu*), and Robin (*Planesticus m. migratorius*).

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THE NESTING OF THE SHORT-TAILED HAWK.

BY HERBERT W. BRANDT.

Plate IX.

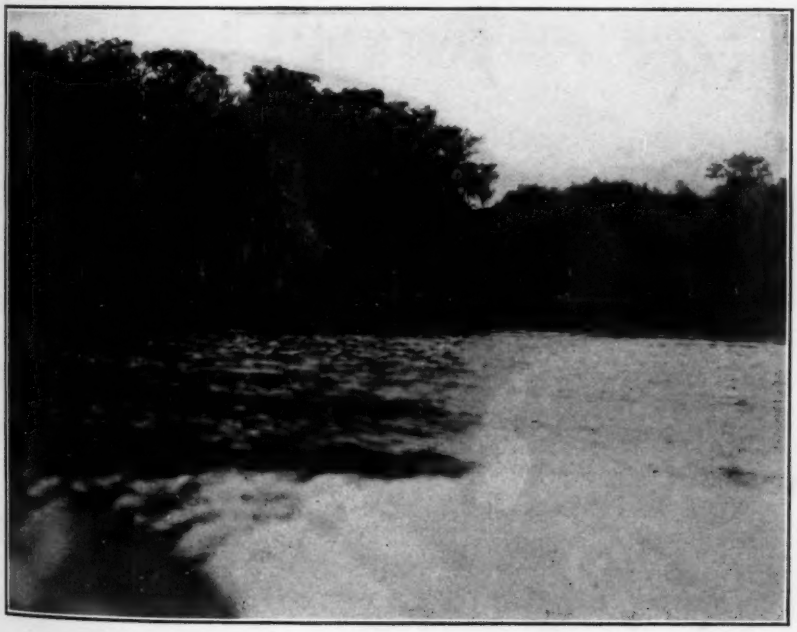
THE Short-tailed Hawk (*Buteola brachyura*) occurs in Florida, Mexico and southward throughout most of the tropical regions of South America. It is apparently a very rare bird wherever found, confining itself to the forests and big wooded swamps, and, therefore, very little concerning it has been written. Because of the inaccessible nature of its nesting grounds the authentic eggs of this Hawk are, in collections, perhaps the rarest of any of the Raptores nesting within the United States.

One of the most interesting things about this bird is the melanistic, or black, phase; in fact, this bird is known among the natives of Florida as the "little black hawk." Most of the North American Buteos have a melanistic phase (e. g., *Buteo borealis*, *Buteo swainsoni*), although the wholly black plumage is comparatively rare, whereas, in *Buteola brachyura* it seems to be the prevalent form. Indeed for a long time, it was thought that the dark phase of the present bird was a distinct species. When the Short-tailed Hawk was first taken in Florida by W. S. Crawford at Oyster (=Estero) Bay, Lee County, January 28, 1881, and recorded by Mr. Robert Ridgway in the 'Bulletin of the Nuttall Ornithological Club' for October of that year (Vol. VI, pp. 207–214), the question whether or not the black phase (*Buteo "fuliginosus"*) was specifically identical with the light phase (*B. brachyurus*) was not definitely settled. In March, 1889, near Tarpon Springs, Florida, Mr. W. E. D. Scott found a pair of these Hawks just starting to build a nest. The location was on the edge of a hammock, up forty feet in a gum tree. The female was in the light phase and the male in the dark phase. Both birds were collected by Mr. Scott before the nest was completed, which settled the problem of the phases of this species ('The Auk', Vol. VI, 1881, pp. 243–245). Mr. Scott in the same paper recorded the capture of five more specimens from Florida—one in the light phase taken in company

with one in the black phase at Chatham Bay, November 12, 1888, and three in the black phase taken as follows: Miami, October 11, 1883 (♂); Chatham Bay, February 2, 1889 (♂); source of Caloosahatchie River (no date or sex mark).

It has been suggested, also, that the phases represented different sexes, but our investigation indicates that this is not the case. I have counted the specimens of this Hawk in the United States National Museum collection and find them to be divided as follows: White phase, 1 male, 2 females; black phase, 5 females, 5 unsexed. In the Museum of Comparative Zoology, however, there are 4 white females and 4 black males. In Florida we saw but five individuals, four of these in the dark phase. Among the specimens I have seen there does not appear to be any intergradation between the phases, so prevalent among the other Buteos. Furthermore, from the data available, above and elsewhere, it seems that the black phase is somewhat more numerous than the light phase, which makes this species unique among the dichromatic North American Hawks.

The first complete nesting record of the Short-tailed Hawk was reported by Mr. C. J. Pennock in 'The Auk' for 1890 (Vol. XII, pp. 56). He found, on April 3, 1889, a nest at St. Mark's, Florida, in a pine tree. A month later his boatman took one egg from the nest. Its dull white showed blue when held against a strong light. It was marked on the larger end with reddish brown in small spots and blotches over about one-fourth of the surface, with a few fine spots extending to the middle of the small end. These were, however, so small that they could hardly be seen unless closely examined. Mr. Pennock gave no description of the nest except that he took it for an old Heron's nest to which fresh twigs of green cypress had been added. All the information that Bendire had concerning this Hawk he obtained from the articles by Scott and Pennock, before mentioned. Bendire in his 'Life History of North American Birds,' (I, 1892, pl. VIII, fig. 7) figured the egg taken by Pennock, which is now in the collection of the Academy of Natural Sciences of Philadelphia. There seems to have been no information published concerning the life history of this species since the early 90's.



1. NEST AND EGGS OF THE SHORT-TAILED HAWK.
2. EDGE OF ISTOKPOGA LAKE CYPRESS SWAMP, FLORIDA, WHERE THE NEST WAS FOUND.

UNIV. OF MICH.

UNIV. OF MICH.

In March, 1923, I went to Florida in company with Mr. A. H. Howell of the United States Biological Survey, the objective of the trip being to study the nesting habits of the Short-tailed Hawk. We were fortunate in getting considerable information concerning this bird from Mr. Donald Nicholson of Orlando, Florida, who had spent a collecting season on Lake Istokpoga. Mr. Nicholson found three nests of the Short-tailed Hawk in the vast swamps about this lake, in 1910, two of which contained young, the third two eggs at the point of hatching, so that he was able to save only one of them.

Lake Istokpoga is the second largest lake in Florida, lying northwest of Lake Okeechobee in the central part of the state. It is roughly twelve to fifteen miles across and is entirely surrounded by a large cypress growth. To the south, reaching nearly to Lake Okeechobee, is a very dense impenetrable swamp, said to be one of the worst in Florida, and one through which very few white men have gone. It is in this swamp and in the big cypress bordering the lake that we found the Short-tailed Hawk.

During the latter half of March, 1923, we spent considerable time watching these birds, and on the 29th of that month, Mr. Howell found a nest in the dense swamp, three hundred yards from the lake. The male bird would sit by the hour in a big cypress tree near the mouth of Istokpoga Creek, evidently using this tree as a lookout perch. Mr. Howell patiently watched this bird on a number of occasions, and finally, about five o'clock, on the evening of the 29th the Hawk left his perch, circled upward a couple of times and dived into the swamp about one hundred yards from the lookout tree. A careful search of the swamp, in the direction taken by the bird, resulted in locating a nest in the top of a tall, slender magnolia, and on rapping the tree the female flushed from the nest.

The following day, March 30, I took a set of two nearly fresh eggs from this nest, which was in a swamp magnolia up fifty-eight feet from the ground. The tree was one foot in diameter at the base and very heavily overgrown with poison ivy, making the ascent rather difficult. It stood in a dense jungle of small trees and undergrowth, with water and mud knee deep. As we approached the tree the male, a bird in the black phase, flew up and

circled above, uttering a few cackling notes, somewhat like the Red-shouldered Hawk. This was heard but once. When we struck the tree the female, a beautiful bird in the light phase, immediately flew off the nest. As I climbed the tree they both uttered a single high pitched squeal, not unlike the alarm note of the Broad-winged Hawk, but a little bit harsher. They continued to utter this note during all the time that I was on the tree, which was at least an hour. They looked like two entirely different species of birds as they sat near or circled overhead. The female was noticeably the larger and nearly pure white below, while the male was as iridescently black as a crow in the morning sunlight. They were very unsuspecting and gentle in appearance, being most dove-like in their attitude, and having none of the ferocious features that are characteristic of the Buteos. Scott, however, speaks of them as being extremely wary and difficult to approach.

The nest was two feet in diameter and nearly a foot in height and was very large for the size of the bird. It was an entirely new nest. In a nearby tree was another nest, similar to this one, which may have been used by the pair in a previous season. The occupied nest was placed in the topmost part of the tree in a three-pronged fork among the heavy vines, and just eight feet below the highest leaf. The tree was only two inches in diameter at the nest, which was built entirely of cypress twigs, freshly broken off, with a small amount of moss and lichens remaining on them. It was lined with finer sticks of the cypress tree, dry magnolia leaves, and a few sprays of green cypress.

The two eggs are bluish white, somewhat lighter than those of the Cooper's Hawk. One is plain, while the other has a few reddish spots about the larger end. The sizes of the eggs are 57.5 × 40.9 mm. and 49.2 × 40.3 mm. The egg taken by Pennock measured 55. × 41. mm.; while the only two eggs in the United States National Museum collection, both singles taken by Dr. W. L. Ralph at San Mateo, Florida, measure as follows: April 4, 1893, one egg, 48.5 × 41.7 mm.; May 12, 1899, one egg, 54. × 41.6 mm. The last two eggs are entirely unmarked. The data of one of these sets of eggs is as follows: "April 4, 1893, one fresh egg taken at San Mateo, Florida. Nest in a very dense cypress swamp about half a mile from Dunns Creek and about same distance from pine

woods. It is in the top of an immense cypress tree, about twenty feet from the trunk at the end of the largest limb, 95 feet from the ground (measured). Male killed was dark phase—female light. Nest composed of small sticks and Spanish moss thinly lined with leaf-covered cypress twigs; it was flat without much of a hollow and placed in front of and connected with a former one."

The sole recently published note on the nesting of the species that I can find was written by H. Kirke Swann in the 'Bulletin of the British Ornithologists' Club,' (Vol. XLII, Feb. 25, 1922, pp. 80) which reads: "*Buteola brachyurus*. Set of two eggs taken in Dade County, Florida, on March 27, 1910. The nest was in a large cypress in seven feet of swamp water, and the eggs were taken for three years in succession, when the tree was blown down in a storm and the birds left. This South American species is very rare in Florida and not many eggs exist in collections."

Unpublished data on two nests of this interesting species found by Donald J. Nicholson of Orlando, Florida, are as follows: "April 12, 1910, Istokpoga Lake, Florida. Nest on extreme outermost branches of a large cypress limb overhanging Istokpoga Creek; thirty feet above water; two eggs heavily incubated. Nest of sticks and moss, lined with green oak and gum leaves and a plentiful supply of green cypress boughs. April 12, 1910, Istokpoga Lake (south of creek). Nest in a tall slender cypress among the uppermost branches of the top, about fifty feet up. Composed of cypress twigs and moss, lined with leaves and moss. Contained two young birds about a week old in white down. Only one parent seen, was of an entire sooty black cast and had a white beak and light yellow claws. While in the tree it screamed the entire time, sometimes circling in the air or sitting in a nearby tree. Heard screaming at night in moonlight."

The Short-tailed Hawk is a very expert flier and sails by the hour, high in the air above the swamps, without a beat of its wings. It is often seen in company with the Swallow-tailed Kite or with either of the Vultures. During nest building the male accompanies the female, which carries sticks to the nest, while he hangs stationary, with motionless wings, fifty feet over the tree. This is the same trait that is shown by the White-tailed Hawk in Texas.

From what has been said, it is evident that this very rare species is a bird of interesting habits and well deserving of further careful study.

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THE STATUS OF THE BLACK GYRFALCON AS A LONG ISLAND BIRD.

BY E. P. BICKNELL.

THE Black Gyrfalcon has for so long a period held an unquestioned place among the rarer birds attributed to Long Island that it is an unhappy matter it should at length come to be put under the ban. Nevertheless the interests of authentic history require that there should now be told a long unpermitted excommunicating tale. This goes far back and traces certain devious happenings that unintendedly issued in a mistaken record.

Probably not many of us of those pioneer days, as they now seem to be, may intimately recall the indefatigable John Wallace and his taxidermist shop, of musty memory, in upper William street, New York. Thither as a youth I used often to go, hesitant of troubling this always busy man, yet how impelled by expectation! Almost always there would be news of unusual local birds, for many were the specimens that came to that work-shop, and it even might befall, on good days, that I should be allowed to take into my hands some rarity not yet dispossessed of the fresh beauty of its natural form and plumage. Thus I came to know the bluff proprietor and, as it appeared, to be in some degree the recipient of his confidence. So it was that in the course of time I was permitted to hear the somewhat secret story of this falcon and how nearly it had missed its place in ornithological history.

It had been brought in to be mounted by two men who kept a saloon in Harlem, as the then suburban part of the city was known, and who often went out gunning into the adjoining county of Westchester. It was from one of these expeditions that the men had returned with their bird. The undisclosing eye of the taxi-

dermist at once marked it as a prize and, in the interest of friendship, or of science, or whatever it might be, the specimen was promptly thereafter dispatched to Mr. George A. Boardman, of Calais, Maine. It was Mr. Wallace's pleasant custom to send unusual birds to Mr. Boardman and here was an opportunity. By no moral quibble could it be accepted that this choice thing should remain in profane hands, and to Mr. Wallace his course of duty lay plain before him. It followed that when the men returned for their bird they learned that by some mishap it had become damaged beyond repair, and they were offered in its place a mounted group of Bob-Whites, which would better fit their understanding and more appropriately adorn the counter of a saloon. With this they departed perhaps well enough satisfied.

Mr. Wallace seemed to plume himself on his tactics in thus rescuing this fine Falcon from oblivion and, in his hearty way, he treated his fair barter of merchandise as an excellent joke. He had made amends to the despoiled owners and the matter was left square. Not so, however, his account with the eternal verities, for there should be an atoning sequel. It seemed to me possible that Mr. Boardman might have noted down something as to the exact place of capture that Mr. Wallace had forgotten, five years having passed since the event. But a letter of inquiry only left the matter as it stood. He had no other information than that his specimen had been taken in Westchester County in the autumn of 1875.

Mr. Wallace had the impression that the bird had been shot in the neighborhood of Mount Vernon, and it was of particular interest to me that this might be established for it would admit the species within the limits of my own home region of those days. I questioned him closely therefore on this point, but he had no certain recollection of any locality that might have been mentioned more definite than "up on the Harlem Railroad in Westchester County." To his way of thinking that was locality enough for any not too exact mind.

Following all this it was in no small degree mystifying to read in the 'Bulletin of the Nuttall Ornithological Club' for April, 1881, a note by Mr. DeL. Berier reporting the capture of this bird on the north shore of Long Island in Queens County. I could infer nothing

else than that some confusion had here come about with the capture on Long Island in 1877 of another one of the Gyrfalcons (*Falco rusticolus gyrfalco*) then in the possession of Mr. Robert Lawrence of Flushing in Queens County, this specimen also having been obtained through the intermediary of Mr. Wallace. (Recorded in 'Bulletin Nuttall Club,' 5: 117, April, 1880, under the name *Falco sacer*, in accordance with the vogue of that period.) It fell to me therefore to write Mr. Berier mentioning my understanding that the Black Gyrfalcon had actually been taken in Westchester County, and in 1875, not two or three years prior to 1881, as his record ran. Mr. Berier rejoined that it was I and not he who was mistaken for he had his facts at first hand. Here indeed was a situation. It looked like a musty matter leading directly back into the taxidermist shop in upper William street. Accordingly, at my instance, Mr. Lawrence, who, also, was in the original secret, well knowing Mr. Wallace and often availing of his handiwork, approached him for a solution. This was simple indeed. Mr. Wallace laughingly admitted a direlection. Not foreseeing that misinformation carelessly tossed off might sometime reappear as a published record he had on the moment taken this ready way to rid himself of a troublesome questioner. Nor is it intricate that a man of short methods like Mr. Wallace who, as we have seen, could frankly cut across niceties of moral distinctions might, put upon his guard, thus meet the interrogatories of a self-introduced stranger. That, as I had it from Mr. Wallace, was then the status of Mr. Berier in upper William street. In all this no inference must lie against Mr. Berier. My brief correspondence with him, which was never afterwards resumed, assured me that while he might be difficult, and sensitively tenacious of his positions, his natural reliability took the straightest line. I never met him.

In the 'Bulletin of the Nuttall Club' for October, 1881, Mr. Berrier returned to his subject, giving some additional particulars, consistently supplied by Mr. Wallace, and correcting the date of the bird's capture. Here also he brushed aside an earlier anonymous record in 'Rod and Gun' (7: 153 Dec. 4, 1875) ascribed to Mr. Boardman, which attributed the capture to Westchester County. This record had appeared in editorial form, according to an old notebook of mine wherein I now find it fully transcribed,

its authorship having been at that time unknown to me. My notebook further reports the substance of a later conversation with Mr. Wallace wherein he once again confirmed that the bird had been shot in Westchester County, and retold, now evidently with some compunction, how he had carelessly misled Mr. Berier. Thus had the whole sorry matter stumbled on to its infelicitous outcome. Nor could the faulty record yet be set right. As the circumstances then were, no other course was open than to hold all the facts in reserve subject to their appropriate future hour.

After what has been recited it may be felt that something of doubt may cloud even the record for Westchester County. Yet the case for that locus unfolds itself in a very natural and credible way. Mr. Wallace so reported the locality to his friend, Mr. Boardman, when sending him the bird soon after he received it, and five years afterwards he so reported it both to Mr. Lawrence and to me. And still again, when the tangled web he had started began to draw, he confirmed his original statement to both of us. And nothing could have been more ingenuous and, let us say, more in good part, than his self-condemning explanation of how he had become entangled.

After all, the two localities that are involved are not many miles apart. The point is that one is of the mainland of New York State across the Sound from Long Island. If the statement in Eaton's 'Birds of New York' attributing this Falcon to Bellport cannot be substantiated it follows that we have no authentic record of this form of the Gyrfalcon ever having occurred on Long Island.

Having thus, reluctant but of necessity, stirred up the ancient history of this specimen, I find myself asking how surely may it be accepted that it was indeed of the variety *obsoletus*. Not that there is any reason at all to doubt this long-standing disposition. It is only that in this group of Falcons exact determination had its greater difficulties in that time than now, and if this specimen has never received an adequate visé, and I do not now recall how this matter may be, it would be apropos could there now be had an authoritative word as to its exact status under the accepted ruling of the present day.

Here is a case that may well put to reflection those who decry all records of rare birds unsubstantiated by a specimen. A very definite record and its required specimen have unworthily stood the test of more than forty years. Better for the cause of truth had this bird been seen convincingly by an experienced and authoritative observer and put on record having, happily, been allowed to keep its freedom!

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A REVIEW OF THE WEST INDIAN BLACK SWIFTS.

BY LUDLOW GRISCOM.

SOME time ago in arranging the collections of this species in the American Museum of Natural History I was struck not only with discrepancies in the statements of writers on this group, but also with the fact that old and fresh specimens from one island differed more from each other than comparable specimens of two supposed races from two different islands. Further, Black Swifts are so difficult to collect, that no Museum in this country possesses an adequate series, and nothing definite is on record regarding individual or seasonal variation. It was obvious, therefore, that no advance could be made without good representation of seasons and localities. I am accordingly greatly indebted to Mr. Outram Bangs and Dr. Charles W. Richmond for loaning me the invaluable specimens in their respective institutions, without which this paper could not have been written. Last fall I was able to examine the series in the Field Museum of Natural History.

As is now well known the true *Nephoecetes niger niger* is from Santo Domingo. In 1910 Mr. Ridgway briefly described *N. n. jamaicensis* from Jamaica, as being "much darker (especially the adult female)." The group is fully discussed, however, in the 'Birds of North and Middle America,' Part V, pp. 704–709 including footnotes. This shows that he had one male from Cuba, five females from Santo Domingo, and six males, three females from Jamaica. Of this material only that from Jamaica was in part recently collected. He also had a male from Dominica and two females from Guadeloupe which he was unwilling to identify

positively, but referred them doubtfully to *jamaicensis*. He states, however, that they are "not quite so dark as [specimens] from Jamaica, and may be different, but the series examined is much too small to settle the question." At first sight, therefore, it is a matter for some surprise that Mr. Cory in 1918 described the Guadeloupe bird as *darker* than *jamaicensis* and averaging smaller. He had a series of 19 old specimens from Santo Domingo, one old specimen from Jamaica, and 15 very poor skins from Guadeloupe. These apparently utterly contradictory statements can, I think, be explained.

Turning now to a study of the 44 specimens before me, five islands are represented, and what is most important both old and recently collected skins are available from each of these islands. Before subspecific variation can profitably be discussed, variation that is individual, sexual, seasonal, or based on age of bird and specimen must first be understood.

a. Sexual variation. This has already been correctly described by Mr. Ridgway. The tail is less emarginate in the female; the size averages smaller; the underparts from the breast down are scarcely darker than the throat and not so sooty black as in the male; in all specimens seen by me the feathers of the lower abdomen are indistinctly tipped with lighter. Hartert (Catalogue of Birds, Brit. Mus., XVI, 1892, page 94) errs in regarding the adults as similar, and the birds with light tips to the feathers below as immature.

b. Seasonal variation. Specimens collected by Beck in Santo Domingo the first week in June show by their sex organs that they were breeding or about to breed. If fresh April, May, and June birds be compared with August and September specimens, certain color differences are apparent. The light tips to the feathers of the forehead and crown largely disappear, are confined chiefly to the sides of the forehead, and are light brownish instead of whitish. In females the light tips to the feathers of the lower abdomen also change from grayish to brownish, and are reduced in number. In several specimens their presence at this season is difficult to detect. Several fresh June specimens apparently share the characters given above for fall birds, but they prove on closer examination to have been shot in the side of the head.

c. Immaturity. While I am quite unable to state how long a time is required to acquire fully adult plumage, certain fall specimens are in addition to the characters given above so much shorter winged than others from the same island that I feel convinced that this is evidence of immaturity. In addition males resemble females in being practically uniformly colored below, and the light tips to the feathers of the forehead are sometimes entirely lacking.

d. The age of the skin. It is now beginning to be recognized that many bird-skins fade with age. This is particularly true of black birds which tend to get browner with age. It is certainly true of the Black Swifts. An old male from Cuba collected by Gundlach is not only browner below than a male collected in 1910, but is also browner than a female collected in 1917. This general principle holds true island for island throughout the series. When proper allowances for season, sex, and age are made, not the slightest color differences of subspecific value can be detected. As a general rule fading affects the black of the underparts first of all, and occurs least often on the back. Mr. Ridgway was entirely correct in stating that recently killed specimens from Jamaica were much darker than birds shot in Santo Domingo in 1883. On the other hand Mr. Cory's Guadeloupe birds shot in 1883 are actually darker than his very old Jamaican specimen. One other point is that a certain amount of fading takes place almost immediately. No males for instance, in the entire series, are so sharply contrasted below as the Beck series from Santo Domingo taken in 1917. The degree of this contrast is appreciably reduced in specimens taken between 1904 to 1908, and some specimens thirty years old show little or no signs of additional fading.

e. Individual variation. While absolutely no color differences of subspecific value can be found to distinguish the birds of any two islands, the question of size remains to be considered. Individual variation in color would seem to be insignificant, but such variation in size is considerable. A glance at the table below shows that for wing and tail, there is a variation of ten percent of the maximum. Nor do the wing and tail vary proportionately in any one bird, that is, a long winged bird may have the shortest tail. Consequently one should beware of apparent average differences in size, especially when based on such small series. Thus the tails

of Jamaican males undoubtedly average longer than those from Santo Domingo. However, the shortest tail of all is a Jamaican bird, the Jamaican specimens were taken over a period of fifty years, and the Santo Domingo specimens were nearly all taken the same week at the same locality, and the females do not show any such difference.

The case is slightly more complicated when we consider the series from Guadeloupe, especially as size has been claimed as a character for this subspecies. Most of them are old skins, collected by Winch in 1883, of very poor quality, with the bend of the wing eliminated as far as outward appearances go. Great care must. therefore, be used to insure the comparability of the wing measurement. The two females do not differ from other females in size. The males would appear to average somewhat smaller. All the specimens were shot early in September, none show any signs of contrast in color below and several are practically without any light tips to the feathers of the forehead, signs pointing suspiciously to their being birds of the year. In this connection, of three good skins recently collected by Noble, the female is more hoary on the forehead and is larger than the two males.

Conclusions. A study of variation according to sex, season, and age shows that no color or size differences are of subspecific value in the West Indian Black Swifts. Two recently proposed subspecies, *Nephoecetes niger jamaicensis* and *N. n. guadeloupensis* should become synonyms of typical *niger*, leaving but one subspecies in the West Indian region.

Material examined with measurements

Locality	Wing	Tail
Males:		
Two from Cuba	149. -155.5	62. -64.
Eleven from Santo Domingo	148. -157.	60. -67.
Six from Jamaica	150. -157.	61. -69.
Three from Dominica	149. -154.	62. -68.
Seven from Guadeloupe	143.5-152.	59. -68.
Females:		
One from Cuba	143.5	52.5
Seven from Santo Domingo	140. -149.	51.5-60.5
Four from Jamaica	140. -148.	53. -59.5
One ? from Dominica	142.	55.
Two from Guadeloupe	145.5-146.5	55. -57

American Museum of Natural History, New York.

COLORADO ANATIDAE.

BY W. H. BERGTOLD.

THERE seems little ground on which to doubt the assumption that ducks, geese, and swans are gradually diminishing throughout the United States; the major part of this decrease is probably brought about by loss of feeding and breeding grounds, a loss incidental to reclamation of swamp and other similar areas, while of course the erstwhile and continuing wholesale destruction of these birds by shooting especially during mating, breeding and moulting seasons is a good second.

The ever onward advance of civilization is bound to continue the first; it is to be hoped that vigorous education as to the value of these birds, and wider spread Federal and State restrictions of shooting will mitigate the second and in part counteract the first.

The average duck hunter seems to care little for the shooting of the future, his efforts being focussed on his present sport and consequently efforts relating to preservation, etc., are lost on him. However there is a respectable moiety which is open to conviction by well supported data as to the decrease of species and the beneficial results, from his point of view, of shooting restrictions; these shooters can be convinced that wise control of shooting will not only save their "sport" but even increase it. Hence it is obvious that all facts relating to these disappearing species, and the causes of their diminution should be collected before they are lost or before it is too late, and especially when such facts might be profitably and convincingly used and published, and thereby the aid of such shooters be secured. These considerations impel me to present for study and preservation in published form a mass of invaluable data recently placed in my hands through the courtesy of Mr. Victor Kennicott of Denver, Colorado.

The data give exceptional definition to one's conception of Colorado Anatidae, and too, will be priceless for those who will have to grapple, in the future, with the question of shooting restrictions, as well as those who in the years to come will be interested

in the scientific aspects of a study of our water birds. The data cover all the mergansers, ducks, geese, and swans shot at the Kennicott Duck Club during a period extending from 1899 to 1922 inclusive (excluding 1914, 1915, 1919, 1920, and 1921, during which years no records were kept), and thus give the results of nineteen years' shooting.

Each year's shooting has been recorded with remarkable accuracy, minuteness and care, the records showing the dates of all "shoots," the names of the several different species brought in and the exact number of each kind shot. The records also embody many references to weather conditions, and many estimates of the numbers of the various species seen on the Club lake from time to time. The majority of the club members are thoroughly familiar with all the common ducks and geese, know some of the rarer species, and always save for identification, at the hands of some competent ornithologist, such birds as they do not recognize.

All of which goes to make these data especially reliable as a base on which to rest tentative conclusions regarding this avian family, as some of its members occur about the Club area, and possibly also for the eastern slope of Colorado.

When this study was undertaken it was hoped that similar records might be secured from the many other duck clubs licensed in this State. This hope was not realized as a considerable correspondence with the officials of many of these clubs showed that none kept a record of sufficient definiteness and accuracy to be of any use in the present survey.

I am given to understand that a few duck clubs of the United States keep unexcelled records, yet on the other hand diligent inquiry has shown me that only the briefest, if any, accounts are preserved by the vast majority of such clubs. This is greatly to be regretted as a detailed account of all the Anatidae collected by these clubs would give a cross-section of the country's Anatine birds to be secured in no other way, and would be of immense value to present and future investigators.

The Kennicott Duck Club's chief lake is part of an irrigation system supplying water to prairie ranches east of Longmont, Colorado, and forms one of the chain of lakes and reservoirs of this system. This lake is at an altitude of almost exactly five

thousand feet, is on the open plains about ten miles east of the foothills of the Rocky Mountains and has an approximate area of 600 acres.

It is probable that the records of this "station" reflect tolerably accurately the Anatine incidence, abundance, and migration of the eastern half of Colorado from the Wyoming to the New Mexico borders; this is however open to debate because the club's records show that many times there were hundreds of ducks on the lake and in the air, with no corresponding abundance in the bags. It is impossible to demonstrate that the birds killed mirror exactly the total numbers and kinds visiting the area, but these records do give us something more tangible than an ocular estimate, and are less open to doubt. I am told that at some eastern duck clubs a shooter often permits certain species to escape, trying meanwhile to get his "limit" amongst the large ducks. This results in a species of shooting selection which militates against such a club's records giving a correct picture of the local relative abundance of different species. I am sure that this selective shooting has prevailed very little, if at all, at the Kennicott Club.

However an effort to estimate the value of the records of this club as indices of the abundance of ducks on the eastern slope of Colorado may well be taken up here and I am by no means convinced that they are more than approximate reflections of the numbers of various ducks migrating over this portion of the State. The club records give more than a detailed statistical account of the weekly shoots, the record book is replete with notes as to weather, the number (estimated) and kinds of ducks on the lake, and cognate facts. A brief review of some of these notations may shed some light on the relation between the number of ducks killed and of those on the lake as determined by visual examination. It is self evident that an ocular estimate of a large flock of ducks is more or less guess work; on the other hand it is startling to witness the accuracy with which a cowboy can estimate the size of a herd of cattle, or a shepherd the size of a flock of sheep. By the same token an experienced duck hunter may be able to form an idea of the number of ducks on a lake, and be approximately correct. This is of course more true of small bunches than of large rafts of ducks.

On September 10, 1910, it was recorded that "several thousand blue-wing teal (came) in from the north." The shooting lists showed that 43 per cent of the day's bags were Blue-winged Teal. On October 21 of the same year it was recorded that there were "thousands of canvasback and gadwall ducks" on the lake, yet only three per cent of the ducks killed were Canvasbacks, and not more than eight per cent Gadwalls. The shoot of September 2 would lend support to the belief that the number of ducks killed was a correct index of the number of ducks on the lake, the shoot of October 21 distinctly fails to do so. Continuing this review it may be said that on November 25, 1900, there were "thousands" of ducks on the lake "mostly widgeons and mallards" and in correspondence with this statement there were 44 per cent Widgeons and 21 per cent Mallards in the make up of the day's shooting. On March 24, 1901, it was written that "two or three thousand on the lake [were] redheads, canvasbacks and pintails;" the percentages of these three species amongst the birds killed in the day's shooting were respectively 30 per cent, 4 per cent, and 35 per cent. Thousands of ducks "of all kinds" were on the lake October 20 of the same year and the shooting results seemingly bore out the correctness of this estimate, since the following percentages of species were then recorded, Green-winged Teal 57 per cent, Pintail 15 per cent, Widgeon 15 per cent, and Mallard 7 per cent. It was stated on March 1, 1908 that "2500 pintails (were) on the lake," implying I take it that this was the prevailing species; this species made up 33 per cent of the ducks killed that day. Finally on March 17, 1909 "four swans and 60 geese" were detected on the lake, yet the records show none of these birds shot. These quotations might be extended to greater length and in more detail but seem sufficient to serve as examples.

I am of the opinion, after a careful study of all the notations, and of the number of ducks killed from time to time that the Club's records form a reasonably reliable index of the abundance of our ducks as they migrate to and fro in the State. It is now impossible to evaluate the factors of skill of shooters, shyness of birds, deliberation in letting certain species escape, and the many others which might dislocate the relation of the numbers of birds killed to the numbers of those frequenting the lake during the shooting season.

One can say, at least, that estimates made on birds killed have a more substantial foundation than those based on ocular impressions.

The common idea of the aridity of our western states leads to the belief that in them there are relatively few ducks and geese; this was probably never true, and it is even less so now, for all the states given to irrigation are covered, so to speak, with a multitude of reservoirs which in the course of a few years have become the resting and feeding (and at times the breeding) grounds of thousands of water birds.

There are about fifty-seven different species and subspecies of the Anatidae which are found in North America north of Mexico, and of these thirty-eight have been taken in Colorado. Twenty-four of these have been shot at the Kennicott Duck Club, showing that the Club's list covers a large proportion of the State list, which includes approximately 65 per cent of the ducks occurring north of Mexico. The records of this Club therefore cover nearly 50 per cent of all North American Anatidae found, from our southern border, northward. It is highly probable that several Anatidae not included in the Kennicott list have been shot at the station, but passed unrecognized. I am convinced, for example, that both Scaups have been shot there, though only the Lesser is listed because both the Greater and Lesser Scaups would be called merely "bluebills."

The following table is a list of all the Anatidae definitely known to occur, or to have occurred in Colorado, those marked with an asterisk having been shot at the Kennicott station.

TABLE NO. 1

American Merganser*	American Golden-eye
Red-breasted Merganser*	Barrow's Golden-eye*
Hooded Merganser*	Bufflehead*
Mallard*	Old Squaw*
Black Duck	Harlequin
Mottled Duck	American Scoter
Gadwall*	White-winged Scoter*
Baldpate*	Surf Scoter
Green-winged Teal*	Ruddy Duck*
Blue-winged Teal*	Lesser Snow Goose*
Cinnamon Teal*	Greater Snow Goose

TABLE NO. 1 *(Cont.)*

Shoveller*	Ross's Snow Goose
Pintail*	White-fronted Goose
Wood Duck	Canada Goose*
Readhead*	Hutchins' Goose*
Canvasback*	Cackling Goose
Greater Scaup Duck	Brant
Lesser Scaup Duck*	Whistling Swan*
Ringneck*	Trumpeter Swan

The following list shows the status in Colorado of those ducks, etc., which have not been taken at the Kennicott station:

TABLE NO. 2

Black Duck; perhaps two State records.
Mottled Duck; one State record.
Wood Duck; always rare; no new record for years.
Greater Scaup; rare.
American Goldeneye; its actual occurrence in Colorado questionable.
Harlequin Duck; very infrequent.
American Scoter; rare winter visitor.
Surf Scoter; rare straggler.
Greater Snow Goose; perhaps three State records.
Ross's Snow Goose; perhaps two State records.
White-fronted Goose; straggler.
Cackling Goose; one State record.
Brant; one dubious State record.
Trumpeter Swan; perhaps three State records.

It is apparent from the above that the Anatidae missing in the Kennicott records are all extremely uncommon or rare throughout the whole State under any circumstances, a fact making it more apparent that the list of this Club is highly representative of the usual, and of some of the more uncommon Colorado Anatidae.

The following table gives the statistical data compiled from the Club records. Both spring and fall shoots are enumerated, until 1912, when spring shooting was prohibited by Federal law.

The table on page 78 is published in extenso in the belief that it will be useful and valuable to future students of North American Anatidae, who doubtless will then have access to records kept in the interim by shooting clubs throughout all of our country. The caption "miscellaneous" of this table embraces eleven different species taken at one time or another during the years of record;

TABLE NO. 3

		1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1916	1917	1918	1922	Total
1	Redhead	18	216	225	245	311	247	75	133	48	71	98	48	58	38	33	38	12	12	20	1946
2	Green-winged Teal	479	1007	739	843	684	681	532	145	899	437	153	391	217	429	423	111	61	78	199	8508
3	Pintail	19	144	176	332	148	204	103	153	21	76	34	40	18	43	39	32	7	7	142	1738
4	Gadwall	68	153	188	70	91	143	111	66	103	116	76	49	45	30	38	25	15	0	32	1419
5	Widgeon	85	341	190	266	308	116	65	39	64	50	24	34	9	27	25	13	2	3	28	1689
6	Bluebill	11	13	31	24	77	30	81	74	33	30	50	53	79	17	10	8	15	7	22	665
7	Mallard	73	170	134	336	300	534	298	313	312	290	141	250	144	257	141	77	4	3	310	4087
8	Canvasback	17	56	41	88	191	60	59	20	9	26	25	5	24	13	13	16	5	12	35	715
9	Ruddy Duck	42	31	1	12	85	60	131	165	141	309	183	110	62	49	46	278	187	233	489	2614
10	Shoveller	75	99	78	87	87	455	111	43	50	146	52	50	34	51	0	71	41	4	38	1572
11	Barrow's Golden-eye	5	6	6	17	19	30	25	31	81	18	5	33	13	4	0	13	0	1	20	327
12	Butterball	8	4	5	2	12	18	15	14	14	58	1	20	0	4	0	4	0	0	6	185
13	Blue-winged Teal	95	222	43	121	29	134	191	66	53	145	70	23	23	88	0	0	0	0	35	1338
14	Miscellaneous	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	133
	Total	995	2462	1857	2443	2342	2712	1797	1262	1828	1772	912	1106	726	1050	768	686	349	360	1376	26936

these species and the total number of each shot during nineteen years are as follows:—

TABLE NO. 4

American Merganser 68	White-winged Scoter 4
Hooded Merganser 3	Snow Goose (Lesser?) 1
Red-breasted Merganser 1	Canada Goose 11
Cinnamon Teal 10	Hutchins' Goose 6
Ring-necked Duck 22	Swan (Whistling ?) 1
Old Squaw 6	

Approximately 27000 individual ducks are now available for study; less than 1 per cent of this number are distributed amongst eleven species (see Table No. 4), and more than 99 per cent amongst the remaining thirteen species.

By estimating the percentages of every species we are able to construct Table No. 5 which follows:

Through the courtesy of Mr. F. G. Bonfils of Denver, Colorado, a member of the Bear River Duck Club (Utah) I am able to incorporate in this table, for purposes of comparison only, the number and kinds of ducks killed at that Club in the fall of 1922; in this table are also to be found data on breeding ducks of the Bear River area published by Wetmore in 'Bulletin 936,' U. S. Department of Agriculture. The percentages given in this table are accurate only to the decimal point.

TABLE NO. 5

	Kennicott Club		Bear River Club			
	By Shooting		By Shooting		By Breeding	
1. Green-winged Teal	8508	31.5	3603	32.4	100	1.4
2. Mallard	4087	15.2	1066	9.7	600	8.2
3. Ruddy	2614	9.7			350	4.8
4. Redhead	1946	7.2	117	1.0	3450	47.3
5. Pintail	1738	6.5	2792	25.2	260	3.6
6. Widgeon	1689	6.3	549	5.0	20	0.4
7. Shoveller	1572	5.9	2227	20.2	500	6.8
8. Gadwall	1419	5.3	405	3.7	400	5.5
9. Blue-winged Teal	1338	5.0			20	0.4
10. Canvasback	715	2.6	196	1.7		
11. Bluebill	665	2.5	63	0.5		
12. Golden-eye	327	1.2	14	0.1		
13. Butterball	185	0.7	17	0.3		
14. Cinnamon Teal					1600	22.0
15. Miscellaneous	133	0.5				
Total	26936		11039		7300	

The ideas and conclusions that appear in the following pages are, it must be kept in mind, based entirely on the records of a single shooting station and they might be altered, negatived or upheld by records secured elsewhere in Colorado. It is not believed or held that they constitute the last word on Colorado Anatidae.

It is held by all of our local duck hunters that the Green-winged Teal is our most abundant duck, though it is often remarked that there is little difference, numerically, between it and the Mallard, an idea quite emphatically contradicted by the figures exhibited in Table No. 5, in which it appears that the Mallard is only half as numerous as the Green-winged Teal at the Kennicott station.

Subject to occasional fluctuations there has been a more or less steady decrease during the past twenty-four years in the total number of ducks yearly killed at this station. This decrease was not due to the war since it began in 1909 and we can grasp the extent of the decrease more easily when it is said that in the period from 1899 to 1908 (inclusive) there was but one year in which the shoot fell below one thousand, while from 1909 to 1922 (inclusive) there was only one year in which the shoot was above one thousand.

The cause of this decrease has been a source of much discussion amongst local duck hunters. It is believed by many that the lakes located close to the mountains have been gradually abandoned by the migrating birds, which, it is held, have tended to visit and congregate on the lakes situated farther to the east out on the plains; others think that periods of high or low water alter the number of ducks killed, an explanation hardly tenable since the water height has merely fluctuated while the duck decrease has been more or less steady; the smaller number of ducks shot is not accounted for by the absence of those formerly shot in the spring, because the decrease was well under way before spring shooting ceased. It is also held that in previous years there were fewer lakes and reservoirs and thus the ducks were more concentrated. Many, moreover, believe that the present duck shooter is not so expert as his predecessors. These explanations do not seem susceptible of either proof or disproof. It may be that the decrease is not actually so large as it seems, an idea engendered by reading the notes of this Club, notes giving visual estimates of the birds

on the lake. It may be that the more recent generations of ducks are wiser and more "gun shy." There is, however, one indubitable factor in explaining a decrease of at least some ducks on this particular lake, and that is the absence of suitable food, which formerly fairly abundant, has almost entirely disappeared since the introduction and multiplication of carp in the lake. A lack of interest in the shooting during part of the World War may also be a factor in the causes of the smaller number of ducks shot during that time.

I am inclined to believe that no single cause can be held accountable for the decrease, actual or apparent, of ducks at the station; though two seem quite reasonable, the decrease of food and fewer expert shots.

It was anticipated and hoped that these data would throw light on the effect of prohibiting spring shooting. Spring shooting was never at this station so intense or persistent as in the fall, hence the records for birds killed in the spring are not large. An examination of the records does not, it seems to me, show whether or not spring shooting was detrimental to the natural increase of ducks. From the cessation of spring shooting in 1912 to 1922 the Club records are available for 1913, 1916, 1917 and 1922 only, making a period of but four years from which one can compare the fall shoots unaffected by previous spring shoots. This number of years obviously is too small to be useful in throwing light on this particular question. One may well ask, however, if the noticeable increase of ducks in 1922 might have been due to the accumulated effect of ten years' prohibition of spring shooting? There is a yearly fluctuation in the actual and proportional numbers of each species demonstrable by the shooting records; thus of all the Canvasbacks shot in nineteen years 27 per cent were taken in 1903, 20 per cent of all Widgeons in 1900, 19 per cent of all Ruddies in 1907, and 31 per cent of all Butterballs in 1908. Forty-seven per cent of the total shoot (all species) in 1907 were Green-winged Teal, 60 per cent of the 1917 shoot were Ruddies, and in 1922, 26 per cent were Mallards. The largest shoots of two or more species do not occur in the same year; the year of the greatest Mallard shoot being 1904, while that of the Green-winged Teal was 1900. There is a marked difference in the ratio between two given species from year to year;

in 1899 48 per cent of all ducks shot were Green-winged Teal, and only 4 per cent were Ruddies, while in 1917 the Green-winged Teal made 20 per cent of the year's shoot and the Ruddy 60 per cent. A large shoot in a given year does not necessarily thereby increase the number of any given species; in 1902 the total shoot was 2444, which included eighty-eight Canvasbacks, while in 1903 the total was smaller (2344) but then there were double the number of Canvasbacks as compared with 1902.

The records of this Club have enabled me to form a new conception of the relative abundance of Colorado ducks, a definite picture such as I never before had.

For the sake of convenience, judging by the records of the Kennicott Club it may be said tentatively that Colorado Anatidae fall into the following divisions:—

Abundant:

Green-winged Teal	Mallard	15 to 30%

Common:

Ruddy	Shoveller	5 to 9%
Redhead	Gadwall	
Pintail	Blue-winged Teal	
Widgeon		

Uncommon:

Bluebill	Butterball	1 to 2.5%
Barrow's Golden-eye	Canvasback	

Infrequent, rare, or straggler:

All of the species listed in Table No. 2 plus the fourteen Colorado species never shot at this Club: 0.5%.

The Green-winged Teal, Mallard and Ruddy together contribute 55 per cent of all the ducks shot at this station from 1899 to 1923.

I regret that time did not permit investigating the relation between weather conditions in the fall and the dates of first arrivals, and of large flights. There is a decided difference in the reaction to weather conditions amongst several species appearing at the Club lake, and also seemingly a difference in different seasons. Thus the Mallard will remain at the lake as long as there is open

water, whatever the weather conditions may be. Then too there seems less connection between storms and the arrival of ducks in the spring, at which time they appear just as soon as there is open water, regardless of other conditions. The ducks even seem then to leave for the north despite local storms; it is recorded that on April 14, 1901, it was snowing but the ducks had left during the previous twenty-four hours, and on April 5, 1904, it was cloudy and stormy, yet the birds had departed the night before. Geese are apt to stop on the lake during a spell of stormy weather, a fact substantiated several times by the Club notes. There is abundant testimony in the records that large flights suddenly appear as heralds of, or passengers in, a severe storm; nevertheless there are also many statements showing that thousands of ducks come in, and also leave during fine weather. This is especially true of the common Teals, in late September and early October.

The relation of Anatine migration to meteorologic conditions is obviously a complex one and for a full elucidation there must be in hand data gathered from several different fields; mere local data do not suffice. It seems to me that one of the most promising leads would be the collection of Anatine migration data from the duck clubs of our country, to be studied in conjunction with information concerning continental and local weather conditions. The latter is already more or less in hand, and readily accessible to one with time for such research, while some well directed and persistent missionary work with officials of the duck clubs would in a few years more than supply the material to satisfy the first of these requirements.

The following remarks relating to particular species are based on the Club's records and embody conclusions which have been reached through a study of the nineteen years' shooting and observations; to these conclusions and remarks are added comments which seem pertinent in the premises.

Assuming that the birds killed at this station were migrating it will be of interest, and perhaps value, to compare statements on Anatine migration and abundance made in Cooke's fundamental publications on Colorado Birds (1897 et seq.), with the results of a study of the Kennicott records and the data given in Table No. 5 relating to the Bear River Duck Club.

Lophodytes cucullatus. HOODED MERGANSER. **Mergus serrator.** RED-BREASTED MERGANSER.—These are amongst the rarest of all ducks found at the Kennicott station. This statement holds true for the nineteen years shooting record; nevertheless in 1897 Cooke qualified them both as being perhaps not uncommon. It is possible that both species have become more infrequent since that date. On the other hand his correspondents on whom he relied for data, having been scattered all over Colorado, might have collected a wider range of information which would have given a correct evaluation for that time of the frequency of these two species, an evaluation perhaps of more worth than one coming from a single location. However the long continued and careful recording made by this Club might counterbalance such a disadvantage and would seem to be worth great weight in reckoning the abundance of the two species we are now considering. Again it is to be said that it is greatly to be regretted that the numerous duck clubs of Colorado have not kept careful records of their shoots. Such records would be invaluable and would help to place beyond cavil any questions as to the abundance of any species, and similar problems.

Mergus americanus. MERGANSER.—Far more common than its two cousins, forming 0.25 per cent of all ducks shot during the record period. It is quite probable the actual incidence is greater than these figures indicate for I am of the opinion that the Shelldrake is frequently recognized by the experienced shooter and deliberately permitted to escape, its well known inedible qualities carrying with them safety for the bird. I should say that it is now about as abundant as at the time Cooke said it was "not uncommon."

Anas platyrhynchos. MALLARD.—This splendid duck forms more than 15 per cent of the nineteen years shoot; it reaches its spring maximum at the Club during the last week of March and the first week of April, and in the fall it has a continuous maximum, so to speak, from the second week in November onward all winter, or until the lake is frozen over. It has, in nineteen years, stood first once in abundance in a year's shoot, while it stands second as the commonest duck for the entire period just mentioned. It frequently lingers all winter in enormous numbers whenever there is open water in the Club lake, just as it does at many other suitable localities in the State. It must be just as hardy as any so called "sea duck," judging by its indifference, in Colorado, to cold, storm, and freezing conditions. A scrutiny of the notes embodied in the Club records also casts an interesting side light on the abundance of the Mallard at this station. On November 1, 1904, it was noted that there were "ten thousand ducks on lake, mostly mallards," and this condition as to numbers and species is again recorded a week later. One must again admit that a visual estimate of the number of ducks on a lake is rather a shaky foundation on which to base a statement of a species' abundance, yet any old duck hunter knows how occasionally ducks are present beyond counting, in myriads as it were. There

is no doubt in my mind but that the number of Mallards killed in nineteen years form but a small fraction of those that actually visit the lake.

Chaulelasmus streperus. GADWALL.—This so called western species stands eighth in the scale of abundance, but varies much from year to year. In 1901 one hundred and eighty-eight were killed, and only forty-five in 1911 (the last year of spring shooting). This species reaches its maximum about the fourth week of October. It seems to me that Cooke's characterization of it as "common" is correct, only as Mergansers are concerned.

Mareca americana. WIDGEON.—This is another duck which varies greatly from year to year in abundance at this station; 20 per cent of all the Widgeons shot at this Club were taken in 1900. The bird reaches its maximum during the first week of November but at no time is it abundant, forming only about 6 per cent of the total shoot for nineteen years. By this club's data it is more common than the Shoveller, hence it cannot be said to be "tolerably common" if the latter be "common" (Cooke).

Nettion carolinense. GREEN-WINGED TEAL.—This is by far the most abundant duck of the State, it stands at the head of the Club's list making more than 31 per cent of all the ducks shot in the record period. It is probable that quite a few of these birds were raised in local Colorado breeding areas and in such southern areas as Salt Lake, but it is obvious from its great numbers that the bulk must come from northern breeding grounds. This duck has ranked first yearly for thirteen years at the Kennicott Club, it reaches its maximum in seasonal abundance during the second week of October, and once, in 1907, it formed as much as 47 per cent of all the ducks killed in a single year. It also is the most common duck killed at the Bear River Duck Club (Utah).

Its total at the Kennicott station for nineteen years was more than twice as large as the next most common species, a fact which gives one a good idea of its numbers in Colorado. There is, however, no such striking difference between the two most common species at Bear River as there is at the Kennicott Station.

Querquedula discors. BLUE-WINGED TEAL.—This species is often rated as a "common" species in Colorado, in fact one authority says in effect that it is as common as its close relative, the Green-winged Teal. As a fact the Blue-winged Teal forms only 5 per cent of the ducks killed at this station, and ranks ninth in abundance there. It is the first duck to come back in numbers in the fall, the peak of migration occurring earlier in Colorado than that of any other duck, to-wit, during the last week of September and the first week of October. It is evidently more common in Utah for it stands fifth in abundance on the Bear River list. This duck is, to all intents and purposes, absent in the spring at the Kennicott Club lake, as in only two springs out of nineteen are there records of its having been killed at the Kennicott lake.

Querquedula cyanoptera. CINNAMON TEAL.—In view of the fact that this species has been recorded as breeding somewhat commonly in

Colorado, I am unable to understand its rarity at the Kennicott Club, where but ten individuals were killed from 1899 to 1922. Of these ten four were taken in the fall of 1904 and three in 1907 and 1908, thus leaving but three for the remaining years of record. The Cinnamon Teal is next to the commonest breeding duck at the Bear River Club, where during 1914 and 1916, according to Wetmore,[1] approximately sixteen hundred of these birds were nesting. Notwithstanding this local summer abundance none are listed as having been killed at the Bear River Club during the shooting of 1922; this absence has been explained on the grounds that the Cinnamon Teal leaves Salt Lake before the fall shooting opens. It is possible that a similar condition obtains at the Kennicott Club. I have no further data or information which might shed light on this interesting problem.

Spatula clypeata. SHOVELLER.—The "Spoonbill" supplies about 5 per cent of the ducks shot at the station, it being what might be called a consistent visitor to the region, since the numbers shot each year range closely at about the same level. However, it, too, has years of extraordinary abundance. In 1904 four hundred and fifty were killed, these birds forming nearly 17 per cent of the whole shoot for that year. There were also in this year unusual flights of Green-winged Teal, and Mallards, which with the Spoonbill then totalled more than 60 per cent of the year's shoot.

The Shoveller is evidently more common during the shooting season at Bear River than at the Kennicott station for it is third in abundance at the former and seventh at the latter.

Dafila acuta tzitzihoa. PINTAIL.—This subspecies is one of five ducks which are all fairly close together in their average of abundance in eastern Colorado during migration. It makes up about 6 per cent of all the ducks killed at the Kennicott station, and there reaches the peak of its maximum numbers during the first week of October. It must be pretty evenly distributed over the western part of the United States since it stands seventh amongst the breeding ducks of Bear River, and is fifth of those killed at the Kennicott Club lake; it is however next to the commonest duck killed at Bear River, the Green-winged Teal only, ranking it there.

Marila americana. REDHEAD.—We must regard the Redhead as very unusual in its seasonal distribution along the eastern watershed of Colorado because on an average more than 60 per cent of the year's kill of this species occurs in the spring. It breeds sparingly in Colorado yet it is the most common of the ducks nesting at Bear River, the difference probably being caused by more extensive and favorable breeding and feeding areas at Bear River. The situation in these two areas is reversed, judging by the numbers shot, for the species stands fourth in the list of ducks killed in nineteen years at the Kennicott Club, and eighth amongst those killed in 1922 at Bear River. It would be of much interest were we to know the cause of the greater vernal abundance of the Redhead in Colorado. This spring preponderance was not brought about by one or two large

[1] Bulletin 936, U. S. Dept. Agriculture, p. 5.

spring flights sending the records up as the Redhead was more common in the fall than in the spring only four times during the whole record period. It is possible that in autumn the migration route splits, while in the spring nearly all the birds go northward, east of the mountains. In the spring it is most abundant during the second and fourth weeks of March, while in the fall there is only one peak, that is to say in the second week of October. About 7 per cent of all the ducks killed at this station since 1899 were Redheads. The species seems to be gradually growing less common on the Kennicott lake, if one can judge by the numbers killed each passing year.

Marila valisineria. CANVASBACK.—The Canvasback is a relatively uncommon duck at this station as on an average only thirty-five to forty are killed there each year; however, 191 were shot on the lake in 1903, a number which formed 27 per cent of all the Canvasbacks shot at the station during the period of record. This species stands tenth in abundance at the Kennicott Club, outranking the Bluebill by less than 1 per cent.

Marila affinis. LESSER SCAUP. BLUEBILL.—It is somewhat strange that the two ducks showing an abundance greater in the spring than in the fall should belong to the same genus.

The Lesser Scaup as well as the Redhead is more common in the spring than in the fall; from 1899 to 1911 (inclusive) 656 Bluebills were shot at the Kennicott station, of which 417 were taken in the spring. Expressed otherwise 63% of the thirteen years collection were from the spring shoots and only 37% from the fall. At best the Bluebill may be classed as an uncommon duck in Colorado, since it makes less than 3% of the ducks killed at the Kennicott station in the record period. Its spring maximum falls into the last week of March and the first week of April, while in the fall its greatest abundance is during the last week of October. The probability that some of the "Bluebills" are Greater Scaups has already been referred to.

Marila collaris. RINGNECK.—This duck is a rare one in Colorado, for in nineteen years only twenty-two were killed at the Club lake; the fact that in 1904 eight were shot, and in 1909 eight more, leaving but six which were recorded in the other seventeen years, gives a striking view of the Ringneck's rarity in Colorado, and also a good index of the irregularity of its visits to the area. The Ringneck is one of eleven species and subspecies which, collectively, make only 0.5 per cent of all the Anatidae shot at the Kennicott Club lake.

Glaucionetta islandica. BARROW'S GOLDEN-EYE.—The average duck-shooter naturally does not distinguish between the American and the Barrow's Golden-eye, so in the absence of positive identification, and on geographical grounds, all Golden-eyes shot at this station have been taken as Barrow's Golden-eye. The extreme rarity of the American form also militates against assuming that any of the Kennicott Club Golden-eyes were of this subspecies. The Golden-eye is subject to wide annual fluctuations

in numbers; for example, 25 per cent of all the birds of this species shot during the Club's record period were taken in 1907. Judging by shooting records alone the species is about as uncommon in Utah as in Colorado, standing in Utah as eleventh and in Colorado as twelfth in abundance.

Charitonetta albeola. BUTTERBALL.—This handsome species is another of Colorado's rare ducks; the number shot in any one year has never been above twenty, except in 1908 when fifty were killed making 31 per cent of all the Butterballs shot at the station since the records began. At best it supplies less than 1 per cent of the ducks killed at the station, yet it is a regular visitor each fall, for in but two autumns of the nineteen has it failed to be listed as amongst the ducks brought in by the gunners. Moreover the total number shot in nineteen years exceeded by more than fifty the total number of all the eleven rare ducks combined, which fact is an added index of its distribution.

Clangula hyemalis. OLD-SQUAW.—It is held by many that the Old-wife is but a straggler in Colorado, nevertheless the number shot at this station during the record period equals 50 per cent of the Cinnamon Teal shot there. This forms a good scale by which to appreciate the rarity of this Teal at the Kennicott Club lake, especially when we realize that only six Old-squaws were collected at the station in nineteen years.

Oidemia deglandi. WHITE-WINGED SCOTER.—There can be no question as to the rarity of this Scoter in Colorado; a fact reinforced by the records of this Club, which show that only four individuals were shot there from 1899 to 1922 (inclusive).

Erismatura jamaicensis. RUDDY DUCK.—The incidence of this species at the Kennicott station is most interesting. For six years (1899 to 1904) the average annual collection was about forty. In 1905 there was an abrupt and decided increase, the yearly average for the following six years jumping to about one hundred and seventy-five, for the next three years the average annual shoot was again about fifty, and finally from 1916 to 1923 the number of Ruddies killed averaged each year about three hundred. It is evident that there has been a more or less steady increase of the Ruddy at this station for a number of years, and that laterally the increase has been very marked. The pre-war percentage of the Ruddy to all others was 5.9 while the post-war was 42. In casting about for an adequate explanation of this increase many have come up but none seems susceptible of proof. Some local gunners seem to think that the use of a motor boat on the lake tends to keep the Ruddies in the air resulting in more chances as they fly near the blinds. It is also possible that the continued diminution of many of the larger species has led to a gunner making a choice between killing the smaller Ruddy, or going home without getting any ducks.

Of the total of all Ruddies shot at this station in nineteen years about 20 per cent were shot in 1922, and 60 per cent of the total duck shoot of 1917 were Ruddies. This species has been the ranking one in numbers

killed for five years, displacing the Green-winged Teal in its supremacy of the previous thirteen years, but for the whole period of nineteen years the Ruddy ranks only as the third most abundant duck. If it continues to increase in the near future as it has in the recent past it will have to be classed with the Green-winged Teal and the Mallard as an abundant Colorado duck. The Ruddy reaches its maximum abundance at the Kennicott station during the second week of October.

Geese.—Eighteen Geese have been killed at this station during nineteen years, to-wit, eleven Canada (*Branta canadensis canadensis*), six Hutchins' (*Branta canadensis hutchinsi*), and one Snow Goose, presumably the Lesser (*Chen hyperboreus hyperboreus*). This number does not however correctly reflect the abundance of Geese in the area, for the annotations to the record show that many Geese were seen on the lake at various times but none secured. Such notes as these illustrate this point:—"Seventeen Geese on the lake" March 11th., 1900, and "more than 60 geese on the frozen lake" March 17, 1919. It is uncommon for these shy birds to pass so close to a blind that they are within gunshot, which helps to account for the small numbers shot. No Hutchins' Geese have been killed at this Club since 1901.

Swans.—The Kennicott Duck Club has on its list but one Swan since 1899, presumably a Whistling Swan (*Cygnus columbianus*); however "four swans" were seen on the lake ice on March 17, 1919.

1159 Race St., Denver, Colo.

AN EAGLE OBSERVATORY.

BY FRANCIS H. HERRICK.

Plates X—XII.

THE domestic life of the White-headed Eagle (*Haliæetus leucocephalus*) has never before been subjected to close scrutiny and accurate record, in spite of its wide distribution, its commanding appearance and its great notoriety. Although for upwards of one hundred and forty years the emblem of the courage, the power and the authority of a free and sovereign people, the national aegis has not always afforded it adequate protection: decried by some for the ignoble qualities which it too often displays, it has been ravished and persecuted on every hand: from the days of the Indian intrepid climbers have repeatedly reached its nest, if only to rob it of its eggs or young. It should be noted, however, that greater consideration has sometimes been shown when those young

have been taken to save them from the wrath of an outraged farmer in whose eyes the tame villatic fowl would better grace the dollar that this bold depredator of his poultry-yard.

The eagle was adopted as the national symbol of the United States by Act of Congress, June 20, 1782, when a design for a national coat-of-arms, or in the language of heraldry, for an "armorial achievement and reverse," was approved. The immediate need was for an official sign of sovereignty, to be used as a seal, and it was intended that the device for this should be the same as that for a national coat-of-arms. The principal figure in the obverse was thus described in the report of William Barton and Charles Thomson, Secretary of Congress: "The Escutcheon placed on the Breast of an American (the bald-headed) Eagle, displayed proper, holding in his Beak a Scroll, inscribed with the Motto, viz., "E pluribus Unum"—and in his dexter Talon a Palm or an Olive Branch—in the other a Bundle of 13 Arrows; all proper." It was particularly noted that the eagle was to be "displayed," that is represented in heraldic fashion with wings and talons extended, and that it was to be the American "bald-headed" or White-headed Eagle.[1]

Franklin's poor opinion of our "Bird o' Freedom," which I do not share has sometimes been quoted with approval: in a letter to his daughter, Mrs. Sarah Bache, dated at Passy, France, January 26 1784, he said: "For my part, I wish the Bald Eagle had not been chosen as the representative of our country; he is a bird of bad moral character; he does not get his living honestly; you may have seen him perched on some dead tree, where, too lazy to fish for himself, he watches the labor of the fishing-hawk; and, when that diligent bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the Bald Eagle pursues him and takes it from him. With all this injustice he is never in good case; but, like those among men who live by sharping and robbing, he is generally poor, and often very lousy. Besides, he is a rank coward; the little King-bird, not bigger than a Sparrow, attacks him boldly and drives him out of the district. He is therefore by no means a proper emblem for the brave and honest

[1] See particularly the excellent monograph of Gaillard Hunt; History of the Seal of the United States, Department of State, Washington, 1909.

Cincinnati of America, who have driven all the *king-birds* from our country; though exactly fit for that order of knights which the French call *Chevaliers d'Industrie.*"

At this time the badge of the Order of the Society of the Cincinnati was being made in France, and Franklin, who objected to all orders for Americans, remarked that its displayed Eagle looked more like a Turkey, and added; "in truth, the Turkey is, in comparison, a much more respectable bird, and withal a true original native of America."[1]

On the other hand the Eagle has appealed to the poets of every age as the embodiment of superior courage, power and authority, through its keenness of vision, its habit of soaring to great heights, its defiance of the storm and the wild grandeur of its natural abodes. Allusion to the American Eagle, says Phil Robinson, occur with tolerable frequency. "You can always tell when you are coming upon an Eagle when you find particularly big hemlocks growing up in forests, or when the mountains around begin having 'splintered' peaks. You can cry 'warm,' as in the children's game, when you touch a poet's favorite poet, and 'hotter and hotter' if you find thunder and lightnings in the neighborhood of mountains. Depend upon it, you will hear a 'scream' or a 'shriek' before you are a stanza or two older. Even if the whole bird itself does not come hurtling through the heavens, there will be such a generally eaglish flavor to the imagery that, like a good spiritualist, you will go away satisfied of manifestations of decidedly aquiline phenomena."[2]

The comings and goings of our national bird, still too commonly known as the "Bald Eagle," have been zealously noted by every local ornithologist. The young are frequently captured and can be reared as readily as those of any Hawk,— indeed in one instance have been hatched and reared in confinement,—and Eagles, both old and adolescent, can be studied without difficulty in captivity.

In rare instances the nest has been found placed upon the ground, as in certain remote islands where isolation would seem to afford all needed protection. According to rule, however, the White-

[1] See Bigelow: The Works of Benjamin Franklin, vol. x, p. 279, New York, 1904.

[2] See Lippincott's Magazine, vol. vi, n. s. 1883.

headed Eagle establishes its great eyrie in lofty trees, in the wilderness often, but not infrequently in the neighborhood of man, at a common height of eighty feet, or it may be even one hundred and fifty feet from the ground, and in this part of the country the choice may fall as readily to a dead as to a living tree; with no attempt at concealment the Eagles go boldly about their business, relying upon circumspection for their own safety, and upon the inaccessibility of their eyrie for that of their eggs and young. To such conditions we must attribute the fact that the nest-life of our Eagle has hitherto escaped that close scrutiny which alone can satisfy the student of animal behavior.

The statements just made are believed to be generally true, but further qualification would be needed to do justice either to individual differences or variations which might be expected from the same individual under different conditions, as will be fully explained in a later paper.

The Golden Eagle (*Aquila chrysaëtos*) which ranges over a large part of the northern hemisphere and is perhaps the more characteristic species west of the Mississippi, commonly nests on high cliffs or on ledges of the mountain-side. Ornithologists have fared better in attempting to approach it, although like its near relative it occasionally skies its nest in lofty trees. If preference for a certain locality is a prime consideration with this species, a lack of suitable trees, under such circumstances, may have drawn it to ledge or cliff; but whatever the origin of the habit, it has been possible, by erecting a blind in close proximity to the nest,[1] to observe its domestic life, and to record with the camera the successive stages of its growth from egg to Eaglet fully equipped for flight.

When attempting to learn something of the nesting habits of the American or White-headed Eagle at North Springfield, Ohio, near Girard, Pennsylvania, but with little success, it occurred to me that the difficulties might be overcome, provided the nest-tree and other conditions were favorable, by use of the tent-blind, either by erecting a tower or by making use of a tree for support.

[1] See particularly Macpherson, H. B., 'The Home-Life of the Golden Eagle'. London, MCMIX; Cameron, E. S., 'Nesting of the Golden Eagle in Montana'. 'The Auk' vol. xxii, 1905; and Finley and Bohlman, 'American Birds,' Chap. xxi. New York, 1907.

OBSERVATORY TREE AND NEST TREE, FROM THE NORTH-EAST, BEFORE UPPER PLATFORM WAS ADDED. TOP OF NEST, 81 FT., AND PLATFORM RAIL 85 FT. FROM GROUND.

The conditions at North Springfield, however, were all unfavorable; the old nest had gone down in a storm during the previous winter, and the new one which replaced it was practically inaccessible, being in a living sycamore and surrounded by obstructing branches which spoiled every prospect of approaching it from the south side.

Upon visiting another nest of the White-headed Eagle, at Vermilion, Ohio, on November 22, 1921, it seemed to me that the conditions there might warrant an attempt to carry out a long contemplated plan. My desire was to bring the home-life of this Eagle under the same conditions of exact observation and record as had been repeatedly done for a considerable number of the representative birds of the country, by means of the observation-tent, the use of which was first described in 1901.[1]

This great nest, the history of which may be most conveniently given here, stands in the leaning top of a shell-bark hickory (see Plate X), in an open grove in the township of Vermilion, at a point thirty-eight miles due west from Cleveland, and about three quarters of a mile south of Lake Road, which parallels the shore of Lake Erie; the nest-tree has a diameter of barely two feet at the base; its growth and vigor had long been checked, and there were signs of decrepitude about the great conical nest in its broken top. As noted later the life of this tree practically went out in the spring of 1923. A line dropped from the margin of this nest to the ground on July 20, 1922, measured exactly 81 feet; the nest itself was then 12 feet high, and its circular top, which was very symmetrical, had a diameter of 8½ feet; and according to our estimates its weight was approximately one ton. The nest-tree is bent to the eastward fifteen feet out of line with the perpendicular, not because it is topped by so heavy a weight, I believe, but owing to the prevalent north-westerly winds or to some other cause affecting it at an early age. Four upright branches now support the nest on the east, north and west sides, leaving the southerly sector clear, an advantage the importance of which we could not fail to appreciate; all these branches, which were broken off at heights of from four to ten feet, bore scant foliage in 1922; the stump of still another branch, which once completed the circle on the south side, was buried well down in the nest-structure; the importance of the

[1] See 'The Home-Life of Wild Birds', New York, 1901, 1905.

smaller branch, a mere stub, which rose a few feet from the northeast margin of the eyrie, was not fully recognized until the following year.

This nest, the fourth known to have been built and occupied successively in that part of Vermilion, was started not later than 1890, and has been in continuous use by young and old birds for upwards of thirty-four years. The history of the four nests,[1] so far as can be now ascertained, takes us back to about 1840, and thus covers a period of over 80 years. Since the Eagles are mated for life, and form a self-perpetuating partnership, we may assume that the same pair, or their several successors in the union, have held to the same locality and as long as was possible to the same nest, for the greater part of a century.

The first of these four known nests was situated in woods two miles east of the present one, and was occupied from about 1835 to 1863; in the latter year the Eagles moved a little farther westward, and established their eyrie in a dead tree on the farm of Mr. L. Braun; moving again, owing to the destruction of their nest-tree, they built a third nest on the present Riston farm, one-half mile east of the fourth and last, which as we have seen was started about 1890; twice the blow which felled their nesting-tree was from the hand of nature, a penalty which overfondness for dead trees must inevitably entail, and once from the hand of a farmer wielding an axe.

One hundred and seven feet southeast from the nest-tree rises a great elm, the present monarch of the grove, fourteen feet in circumference at its base and over one hundred feet tall, but already showing marked symptoms of decay; at forty feet its great arms begin to spread about a more central broken shaft. This great pillar seemed at once to provide a possible support for an observatory, which if placed in the very crown of the tree, would be partly concealed, at least from below, and would afford us a wonderful view of the nest itself and of the activities of the Eagles, old and young, of which for so long it had been the focus. Standing to the southerly side of the nest-tree and in a line nearly at right angles to the course of the sun, it seemed likely to offer a good

[1] I am indebted to Mr. and Mrs. Otto Buehring, and to Mr. Adolph Braun, an old resident of the township, for the data given above.

vantage-point for both observation and photography. We thought that a platform could be so placed as to bring the observer and tent to between eighty and ninety feet from the front of the nest; this distance was the only drawback in our calculations, for it was about double that which we had regarded as a minimum; however, we were dealing with large objects, and all other conditions were exceptionally favorable; after all, observations were more important than photography, the difficulties of which could be certainly lessened, if not completely overcome.

In company with a colleague,[1] to whom I am indebted for calling my attention particularly to this nest, we visited the site again in December, with the superintendent of construction at Western Reserve University,[2] an iron-worker and a carpenter; after studying the ground again we decided that the experiment was practicable, and upon receiving the kind permission of the owners, Mr. and Mrs. Otto Buehring, we decided to go ahead.

Would these Eagles leave the neighborhood according to their usual schedule, and permit our work to go forward without disturbing them; or, would they so resent an intrusion into their domestic affairs that every tie would be broken, and their great eyrie abandoned; or again would the publicity certain to follow any unusual undertaking of such a kind tend to hamper and perhaps defeat us in the end? As none of these questions could be answered with assurance we could only await the result.

We had hoped to erect the platform and ladder while the Eagles were away, leaving them undisturbed during the earlier and more critical period, and to devote our attention during the first season to the later and possibly more interesting phases of nest-life. We could not afford to take any chances with these birds until we had learned more of their particular habits and idiosyncrasies, knowing full well that any serious indiscretion on our part might well spoil the game at any moment. As it happened, the winter of 1921–22 was one of the mildest on record; the Eagles were absent from the neighborhood for only about a fortnight in the first part of January, and our work had to go forward while they were still

[1] Dr. H. S. Booth, of the Department of Chemistry, Western Reserve University.

[2] Mr. H. A. Headline, to whose skill and oversight in carrying this work to a successful issue I am greatly indebted.

on the ground. Owing to interruptions, the painting of the structure was not completed by the first of March and, as nesting of these Eagles is due to begin early in that month, this detail was partly neglected. It was soon found that the Eagles had accepted the platform, and were using it as a perch; as circumstantial evidence of this a characteristic "casting" was found on the floor under the railing.

In the account which follows[1] the reader is reminded that what we desired was not merely a temporary shelter for snapshot photography, but a lookout which would be safe, easily accessible, and suitable for continuous observation for many weeks, which would outlast the season, and therefore would be strong enough to endure the fierce storms which on occasion rage over the region of the Great Lakes.

The platform, which was to hold our tent (see Plate X), was ten feet square, and stood 82 feet from the ground; this was surrounded by a broad board base, and a strong rail four feet high. The top of the rail, the level at which a camera would ordinarily be set, was exactly 85 feet 7 inches from the ground, and over 4 feet above the margin of the nest.[2] Although the inside of this nest was but slightly depressed, the depth being not over four or five inches, it was impossible at this height and distance to see to the bottom of it; accordingly early in 1923 we added a second platform and carried it as high as practicable (see Plate XII.)

The superstructure was painted a dull olive gray, but as already intimated the nesting season was upon us before this could be

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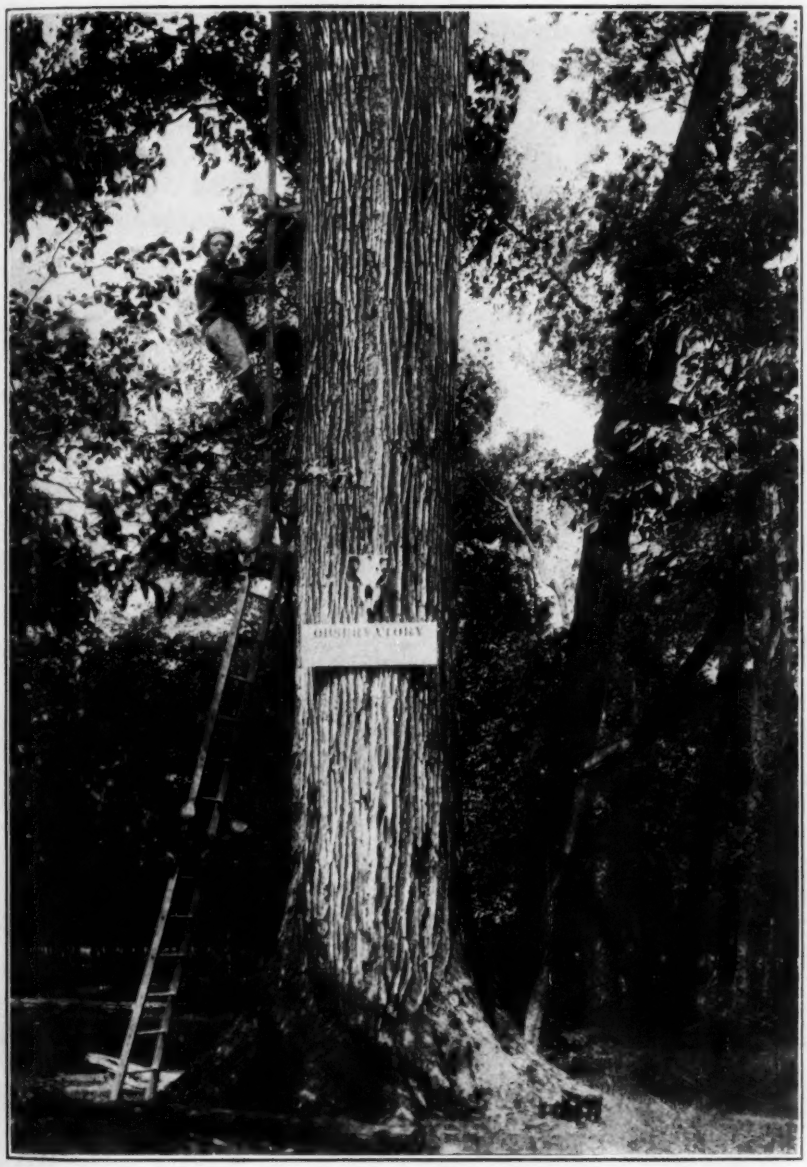
[1] I wish to express here my appreciation of the financial aid and encouragement in the conduct of this work, which I have received from Western Reserve University, through the interest of its Treasurer, Mr. Sidney S. Wilson, who has aided me in every way in his power. I would also acknowledge my indebtedness to the Ohio Academy of Science through Dr. T. C. Mendenhall, Chairman of Trustees of the Research Fund for an appropriation in 1922 towards the expenses of this enterprise.

[2] The curious reader may be interested in the following structura details: the sills of the framework which supported the platform were laid in triangular form, each side being built up double of 2 ×6 inch pieces; the three sides were bolted together, and engaged at the angles to the branches of the tree by specially designed steel hangers; the vertical posts, which rested on the sills and directly supported the platform were also of 2 ×6 inch pieces, doubled, and strengthened by braces, which were placed at various angles and were engaged to the tree by bolts; the joists of the platform were also of the same material, laid double, and the floor was of Georgia matched pine, double-laid.



IN MAKING THE ASCENT A STEEL LADDER, BEGINNING 17 FT. FROM THE GROUND, WAS REACHED BY MEANS OF A WOODEN LADDER.

UNIV. OF MICH.

completed. An iron ladder,[1] beginning 17 feet from the ground, led up to a trap-door on one side of the platform; this trap came to be regarded as the only danger-point in the situation, and was always closed by an observer upon entering the platform and always locked upon leaving it. To make the ascent a small wooden ladder was held in readiness at the base of the observatory-tree, and this was kept locked when not in use (Plate XI).

Owing to the novelty of our activities, within sight of a much travelled highway we anticipated that publicity through the newspapers might seriously interfere with our plans, and our fears in this direction were fully justified, for the Vermilion Eagles, which had hitherto pursued the even tenor of their lives with little molestation, suddenly entered upon a fame not at all to their liking and snap-shots of these Eagles and their eyrie were published in various parts of the country; curious sight-seers, photographers and other interested observers began coming from nearby towns and occasionally from a distance, bent on seeing the sights supposedly visible from the ground or of obtaining pictures; although we posted warning notices in the grove, it was impossible to keep these people away; they could not, of course, understand that little or nothing was to be seen from a station on the ground, or that the normal activities of the Eagles at the nest ceased the moment a stranger appeared in the neighborhood. Fortunately these Eagles learned to submit to adversity, and with the advance of the season the curiosity of the public gradually wore off.

On June 7 the observatory was completed by screening the railing and placing in position on the platform a commodious *A* tent specially designed to suit our needs.[2] The tent-material of khaki

[1] Eighteen inches wide, and the first section made up in three sections, of 84 rungs, one foot apart, the parts being bolted together, and secured against the tree; the second section led across the center of the tree and the last ascended direct to the trap.

[2] The dimensions of the tent, over all, were as follows: height, 6½ feet; length, 6 feet; and width, 4 feet, 8 inches. The frame was of Georgia pine, and consisted of two center poles, four uprights (of 4 ft. 8 in.), at the corners, two upper and two lower side-poles, running lengthwise, the former engaging with the uprights at the angles, and the latter joined to them at the floor level, for the purpose of keeping canvas of tent-sides under control, especially during heavy winds; two lower end-poles served a similar function. All uprights and lower side-poles were engaged to the floor of the platform by means of angle-irons; the upper side-poles were engaged to the tops of the posts at each corner, and to a cross-piece of wood behind; to keep the front of the tent more free for observation and

shelter duck answered our purpose admirably, being light, inconspicuous, and so far as our experience went, absolutely impervious to water; grommets at the corners permitted the use of strong guy-ropes, which were lashed to the platform-rail. The last piece to be adjusted was an outer ridge-pole of wood extending ten inches from each side of the peak, and designed to protect our tent from a wire screen, this in turn to save it from injury in case the Eagles should take the fancy of using it for a perch; the tent was entered by a fly in front, which was laced up to keep out the weather.

The problem of securing adequate ventilation, in case of excessive heat, was completely solved by a screen of the same material on the railing. As a matter of general interest we kept daily temperature records, and only twice were we obliged to raise the sides of the tent; at such times by means of the screened rail we were able to maintain the integrity of our blind unimpaired. Contrary to my expectations it was ordinarily cooler on our lofty perch than upon the ground, and with the usual north wind setting fresh from over the lake we were grateful for all the protection which could be secured.

We passed two nights in the tent and weathered some bad storms, but our valuable photographic equipment, which remained in the observatory during the entire period of our work, was never touched by the rain or in any way disturbed. When the tent was finally in place and the necessary openings for the lenses and peek-holes were made, following our usual caution, we left the Eagles to their own devices for four days. Systematic observations were begun on June 13, and some anxious hours were passed on that first morning, when from six o'clock until noon neither of the old Eagles had ventured to approach their eyrie. Meantime the sporadic activities of the Eaglets, their preening, spreading, play with sticks and occasional attacks upon the carcasses left upon the eyrie all inclined me to believe that their larder had been stocked before six o'clock; yet we could not help asking—when would they be fed again? Would the old Eagles shrewdly refuse to enter their eyrie

photographic purposes, the crosspiece was replaced by a V-shaped steel rod, the angle of the V (inverted) engaging with the ridge-pole, and the ends with the forward upright posts.

while the observer was in his tent, or would they entice their young to prematurely leave the nest and would all our labors be rewarded only with defeat and chagrin? As we well knew, a few hours would give the answer. The very grandeur of the scenes then spread before our eyes seemed for the moment to mock our efforts; the dominating object was the great eyrie, which never ceased to fascinate us; its circular top appeared at this height barely at sky-line, and often suggested a stage, on which the two Eaglets, now grown to nearly adult proportions were the actors; it was their gymnasium, dining table and sleeping quarters; the scenery was ever changing with the shifting of the lake-mists, the clouds and sun; below farmers were cultivating their well-ordered fields, now green or brown; and beyond were spread the blue fields of Lake Erie, the shores of which could be followed with the eye from Lorain Bay and Point on the east to near the town of Vermilion on the west. As we looked directly down into the tops of the hickories and oaks we would catch a glimpse of the Red-headed Woodpecker, while his "barbaric yawp" was often sounded close to the tent; and from the ground itself, all about us, rose the friendly calls of Bob-white with little intermission.

Glad of an excuse to leave a spot where every prospect but that most to be desired seemed to please, we closed our observatory,[1] and left it for the space of two hours; in passing through the grove we killed a large spotted snake and turned its light belly up to the sun; two hours later it was gone; Eagles are well known enemies of the serpent, and as we reached the grove again at two o'clock one of our birds was circling overhead with a large object in its talons; if not our snake it was probably a fish. The Eagle's movements were too rapid for us to determine this, but we could certify to a fact of far more importance; the Eagle carried its quarry to the eyrie, where it spent full four minutes and left only upon our approach; the questions of the morning had been answered; the Eagles had accepted the situation and their young were receiving an abundance of food.

[1] I wish to acknowledge my indebtedness to my former students, Mr. Everett C. Myers and Mr. Elbert J. Humel for their assistance during the summers of 1922 and 1923 respectively; through our united efforts we were able to keep the nest and its occupants under continuous observation over a period of 36 days, and total working time of 420 hours; their notes have been incorporated with my own, and without their efficient aid my record would have been far less complete.

As the event proved, in the season of 1922, we had three weeks of close observation of the nest-life of these Eagles, and witnessed forty-nine visits by them to their eyrie, at which the time spent varied from a few seconds to nineteen minutes. Finding that the feeding activities were very irregular, and that they ceased altogether after dark we divided the day into four shifts, my assistant and I taking alternate periods, which extended from about 5 A. M. to 7 P. M., being assured that only in this way could our records be made fairly complete and reliable. The daily visits, at which food was brought, varied from two to six in number, the earliest recorded being at 5:24 A. M., and the latest at 6:48 P. M., they might occur early or late, might be scattered through the day or crowded into any part of it. Four visits by both birds were once made in the space of twenty-three minutes. There was no bill-to-bill feeding, except upon one or two occasions, but the food was merely placed on the eyrie and left there for the Eaglets to help themselves.[1]

Many and curious were the exciting scenes to which we were witnesses by eye and ear. The record of our work with some account of those scenes will be given later. During the coming season I hope to fill in some of the gaps and to improve the photographic results.

II

The previous account was written in 1922, after our first season with the Vermilion Eagles; and now that it has been possible to profit by that experience I will describe the methods adopted and the conditions which prevailed in the following year.

Another story was added to our observatory in March, 1923, and carried us 13 feet higher, which was as far as we dared to go (Plate XII); the second platform, essentially a duplicate of the first, was supported by vertical posts at the corners only, but was strengthened by steel wires stretched crosswise between the upper and lower floors; our aim being to attain a sufficient degree of strength but to avoid too great rigidity. Though severely taxed by high winds which delayed the builders, the work was completed on March 20, the proximate date of the beginning of incubation.

[1] But no inference should be drawn from this fact without consulting our experience in 1923, as given below.

OBSERVATORY WITH SECOND PLATFORM ADDED IN 1923, 95 FT. FROM GROUND.
STEEL LADDER PASSES FROM MAIN TRUNK THROUGH EACH PLATFORM.

UNIV. OF MICH.

The upper platform, standing at a height of 95 feet, brought the observer's eye 100 feet from the ground and 19 feet above the top of the nest; this gave us at all times the great advantage of being able to see into the eyrie, to note the condition of the family larder and to observe how the Eagles, old and young, reacted to their prey. That additional thirteen feet also conferred another advantage almost as great; it enabled us to overlook the grove and the entire countryside for miles in every direction, not to speak of the shore of Lake Erie in the back-ground to the north, and thus to follow the activities of the old Eagles with great precision.

Our experience of last year showed that the daily life of the adult Eagle, during the period of young, consists of a round of activities, repeated at irregular intervals from about five o'clock in the morning until about seven at night; these activities consist of (1) the search after and securing the prey; (2) bringing this food to the eyrie and there serving it to the young or, if hungry, helping themselves; and (3) standing guard on the perch, where they preen at leisure, but where they are seldom or never caught napping; very rarely do they leave the perch and return to it direct or go to the eyrie empty handed.

The full significance of the perch in the nest-life of these birds will be considered at a later time. Since the old Eagles frequently occupy the same perch-tree, often sitting close together, and since the female is the larger of the pair, we could usually distinguish the sex of the visiting bird.

In 1922 the top of the nest-tree at Vermilion was too much obstructed by foliage which hindered us greatly; accordingly at the close of the season the offending branches were all cut away. Now on the northeasterly side of the nest, or the far side as viewed from our station, a stub, as already noticed, rose to a height of three or four feet and then bent away from the nest-margin, to be broken off abruptly after reaching a nearly horizontal position. The lateral branches of this stub were also removed at this time, a seemingly trifling act, but full of significance as the sequel showed. That stub was adopted this year as a perch, thereby changing the activities of nest-life and greatly enhancing the interest of the nesting scenes. After serving food to its young, an old Eagle, instead of repairing to a distant tree-perch, would hop on this branch and

there remain for hours at a time, being virtually on the eyrie itself. The Eaglets also acquired the same habit of using this stub when they were about ready to fly, and possibly for this reason there was no luring of the young from the eyrie, as occurred in 1922. On the contrary, the Eaglets of the present season were supplied continuously with an abundance of food until the day and hour when they left the nest; but what surprised us the more, in view of last season's experience, was that occasional bill-to-bill feeding took place up to the very end of nest-life, a good commentary on the need of continuous and repeated observations in order to understand the real habits and powers of these adaptable birds. Moreover, one of the Eaglets, after having taken to the air, returned in two days to its old home and for twenty-seven hours circulated between the stub-perch and nest. In addition to the changes enumerated above almost the entire nest-tree, as before intimated, was bare of foliage in the present year.

Accordingly we decided to repeat from these new vantage-points our observations upon the late phases of nest-life made in 1922. We discarded the long focus and telephoto lenses, which had served us rather poorly the first season, and relied entirely upon a Press Graflex 5 × 7 plate camera and a Taylor-Hobson Cooke telephoto lens, of 15 inch focus, and having an *f* value of 5.8. This lens gives slightly less amplification than the Cooke Telar telephoto lens, but it has remarkable depth of focus and more speed, both qualities of the first importance for our success. Working at a fixed distance of about 85 feet with Graflex plates we were able in most cases to stop the motion of the Eagles, and in all to obtain fully timed negatives, under the excellent light-conditions which usually prevailed, with exposures of 1/365 or even of 1/435 second. Our photographic work was also greatly facilitated by a well-equipped dark-room, which we were kindly permitted to install at the home of Mr. F. E. Ranney.

As in 1922, we worked in three-hour shifts so as to cover the entire period of daily activity of the Eagles, from five o'clock in the morning until seven in the evening. Though always certain to get plenty of action at some time during the day we could never tell when it would come; accordingly it was necessary to stand by the camera at the tent front, with an eye at a peek-hole, and

with binoculars within reach; there were now no visible activities of old or young Eagles which our camera could not record. Aside from keeping hourly temperature-records, we noted as a matter of personal interest all bird-notes which rose to our ears from the grove below, and all avian visitors which ventured near the eyrie, or which came to inspect our tent; if we relaxed too often, or left the peek-hole to write up our notes, quite as likely as not we would miss something of interest; and when the old Eagles came we were busy enough.

Sixty visits of the Eagles to their eyrie were recorded in 16 days in 1923, and the daily number of visits with food varied from two to eight; the earliest visit recorded being at 5:39 A. M., and the latest at 6:57 P. M.

The weather conditions were the reverse of those experienced in the summer of 1922, but proved very favorable for our work. We did not escape the heat-wave which enveloped the greater part of the country and lasted eight days, from June 18–25; and although one side of the tent was raised to let in the air the temperature at three o'clock in the afternoon, the hottest period of the day, at a point three feet from the floor, ranged from 104°–113° F.; but being shielded from the sun's direct rays we stripped on occasion and passed this period very easily. The Eaglets, now deprived of nearly every vestige of shade, probably suffered more than we did; they would lie quite flat, even turning over on their sides for a change of position, and gaped almost continuously, as did the old birds when on the stub-perch. The most noticeable effect of the heat upon the old Eagles, however, was to drive them from their lofty perch in the grove to the shade of branches lower down in the tree; but that they were not napping even then we had abundant evidence from day to day.

After ten days of brilliant weather with hardly a wisp of cloud ever visible in the heavens, we passed through two severe storms, and once I was on the point of descending for the purpose of safety; our tent was put to the severest test which it had yet endured. The young Eagles at first stood on the front of their eyrie doggedly facing the storm, but as the gusts became too strong for them they lay down in the center of the nest, and so flat that they were with difficulty distinguishable. On June 28 another stiff blow was

encountered, now from the north and accompanied by torrents of rain, but with less danger to our equipment as the wind-pressure was steady and without those terrific gusts which we had endured two days before; on the whole we felt justified in having made our construction strong and elastic enough to meet such emergencies, for had the tent gone down the steel ladder would undoubtedly have held the platforms in place.

At the level of the first platform the top of the eyrie stood close to the horizon line, while at 95 feet, the upper limit at the present time, nest and birds were seen projected against a ploughed field, which this year was planted to corn and extended to the edge of the grove. When gazing upon the scene for the first time from this elevated point I was amazed at the remarkable contrasts which it presented to the eye; the Eagles and their great eyrie seemed like a survival from the past,—a touch of wild untameable nature, hemmed in like an islet in the sea,—with the evidences of man's civilizing efforts all about it; there every form of modern transportation was daily or hourly witnessed; as the eye rested on the broad expanse of Lake Erie, the waters of which meet the horizon at the north, passenger steamboats or larger freight vessels were ever and anon passing between Cleveland and other lake ports; trains on a great railroad, close to the shore, thundered along at stated intervals. Again, paralleling the railroad, ran an electric line for express and passenger service, connecting Cleveland with western points; still closer to the eye along another artery of pleasure and commerce, the Lake Road, ran automobiles and trucks, bound east or west in unending streams. Turning eastward the eye caught in succession the harbor and city of Lorain, and farther southward a forest of chimneys of the great steel works there, the smoke and gases of which often reached us; with a complete turn about we looked down upon the village of Braunhelm through which passed an even greater and more famous railway line; at regular intervals too. morning and afternoon, the thud of an approaching aeroplane, which often passed directly over tent or nest, announced the carriage of the mails and rarely failed to awaken the close scrutiny of the Eagles. At one time even a dirigible airship sailed directly over the eyrie and gave its human occupants a good view of the astonished Eaglets from above.

Many times each day the wary Eagles passed over these busy lines of traffic to reach the Lake, their principal source of food, rising from the field to avoid the many wires strung from poles, apparently undismayed by the sights and sounds with which they had come to be familiar. Strangely mingled indeed were the wild screams of the Eagle with the strident voices of the steam siren and whistle, while a photographic plate which caught the monarch-bird bringing in a fish or serving it to its young, might also register a farmer afield ploughing with team of horses or cultivating his corn. It would be hard to find, and perhaps unreasonable to expect, greater adaptability than this among diurnal birds of prey.

Adelbert College, Cleveland, O.

THRAUPIS SAYACA AND ITS ALLIES.

BY MRS. E. M. B. NAUMBURG.

A STUDY of the series of specimens (181 in all) of *Thraupis sayaca* and its allies in the collections of the American Museum of Natural History from the Guianas, Brazil, Paraguay, Bolivia, and Argentina shows that certain changes in the systematic arrangement of the group is desirable. It is the object of the present paper to bring these proposed changes to the notice of other ornithologists as well as some other matters which have a direct bearing on the subject.

Thraupis sayaca belongs to the Tanagers (Tanagridae), a family closely related to the Finches. In fact, up to the present moment it is impossible to draw any sharp line between them. Even when the anatomical structure is known, it is doubtful whether it will be possible to define satisfactory family limits.

Thraupis sayaca may be described as a small, fruit- or insect-eating Oscine, with nine primaries and a short rather thick Finch-like bill. The bill shows a varied proportion in some of the genera of this family. The Tanagers are as closely related to the Finches as they are to the Warblers, but these purely New World families are weaker types than the more widely ranging Finches according to remarks of Professor W. K. Parker, the anatomist, and this bears

out the opinion that, on the whole, both birds and mammals of the Neotropical Fauna belong to a lower morphological rank.

It seemed to me that the forms of *Thraupis sayaca* were in need of a careful revision. *Tanagra sayaca* was described by Linnaeus in 1766,[1] habitat in *Brasilia*. Brazil has been considered the type locality up to the writing of this paper. *Tanagra sayaca* of Linnaeus is based on Marcgrave's[2] Sayaçu. *Tanagra brasiliensis varia* Brisson,[3] a synonym of *Thraupis sayaca*, is also based on Marcgrave, and perfectly describes this species. Brisson, however, did not see this bird himself. Burmeister[4] in 1856 lumps the species *Tanagra episcopus* Linnaeus, type locality *Brasilia*, from Guiana and northern Brazil and *T. cyanoptera* Vieillot from southeastern Brazil under *Tanagra sayaca* Wied. His description refers, however, entirely to *Tanagra cyanoptera* Vieillot now easily distinguished in the adult male by having the lesser wing coverts bright shining blue as in *T. cana* Swainson. Burmeister asserts that *T. sayaca* Wied is found in the campo region of central Brazil, westward to Paraguay and at the foot of the Cordillieres.[5] The confusion probably arose through the superficial resemblance which the young of *Tanagra cyanoptera* bears to the adult of *T. sayaca* Linnaeus. In 1869 August von Pelzeln[6] writes that *Thraupis sayaca* has been found in three distinct regions.

Under Pelzeln's heading of (1) Southern Fauna he says the species has been found from Parana in the south and from Curytiba and Ypanema in the west, northward to São Paulo and Rio Janeiro and its environs, and to the River Tiete.

(2) Central Fauna. The species ranges from the Rio Tiete at Ytu and the Rio Pardo in São Paulo, north to the environs of the Rio Parana and the Rio das Velhas in Minas Geraes to the Cidade of Goiaz and from there westward to the Rio Araguay on the boundary of Goyaz and Matto Grosso.

(3) Bolivian Brazilian Fauna. Specimens were recorded from the Rio Araguay westward through the Sertao to Cuyabá and

[1] Syst. Nat., I, p. 316.
[2] 1648, Marcgravius Bras., p. 193.
[3] 1760, Briss. av., 3, p. 18.
[4] Systematische Ubersicht, III, p. 176.
[5] According to Dr. Hellmayr the ranges as given by Burmeister are very often purely imaginary.
[6] Zur Orn. Bras., Part III, p. 208.

Caiçara Villa Bella de Matto Grosso and from there northwestward on the Rio Guaporé to the other side of the Forte do Principe de Beira, the present border of Matto Grosso. Pelzeln's range of the species agrees very well with the findings of more recent authors and also with my own.

The geographic distribution of forms which I have examined is as follows:

Thraupis sayaca sayaca is confined to Brazil and Paraguay, occurring from Matto Grosso to Ceara, Pernambuco and Bahia, in the states of Rio de Janeiro (Cantagallo, Rio de Janeiro, Sapitiba); Sao Paulo (S. Sebastiao, Piquete, Ytararé); Rio Grande do Sul (Taquara); central Brazil (S. Leopoldina on the Rio Araguay); southwest Brazil (Cuyabá, Eng. do Gama, Corumbá); Paraguay; Fort Wheeler, and Trinidad.

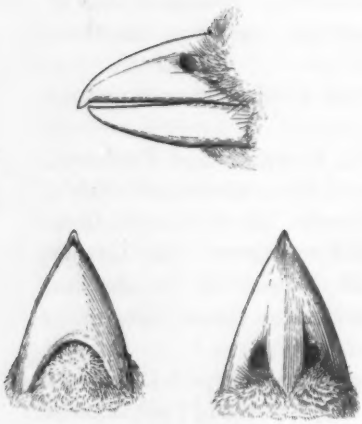
Thraupis sayaca obscura Naumburg, a new subspecies, inhabits the mountain region of Bolivia, in the departments of Cochabamba (Parotani, Todos Santos) and Santa Cruz (California), down to Argentina, in the departments of Tucuman (Tafi Trail) and Salta (Embarcacion) and of Santiago del Estero (Suncho Corral) and Buenos Aires (Barracas al Sur).

Thraupis cyanoptera is found in the southeastern Brazilian states of Espirito Santo (Victoria), Rio de Janeiro (N. Friburgo), São Paulo (Ypanema Iguape), Santa Catharina (Blumenau), and Rio Grande do Sul. It is also found in Argentina in the state of Missiones.

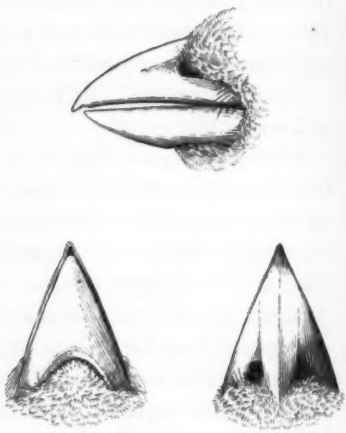
Thraupis episcopus ranges from Cayenne and Surinam to British Guiana, and is found there in the lowlands of Camacusa, Bartica Grove, and on Mt. Roraima, down to northern Brazil in the region of Pará.

Dr. Cabanis in 1850[1] first pointed out the distinctness of *Thraupis sayaca* Vieillot from *Thraupis cyanoptera* Vieillot. In 1866[2] he declares that *Tanagra sayaca* Prince of Wied[3] includes the species *sayaca* and *cyanoptera*, that Burmeister in 1856 was of the same opinion, while Sclater[4] decided that *Tanagra sayaca* Wied was a

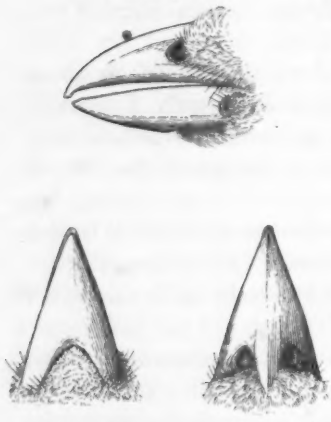
[1] Mus. Hein, I, pp. 28 and 29.
[2] 1866, J. f. O., p. 305.
[3] 1830, Beitr., III, p. 484.
[4] 1886, Cat. B. B. Mus., II, p. 157.



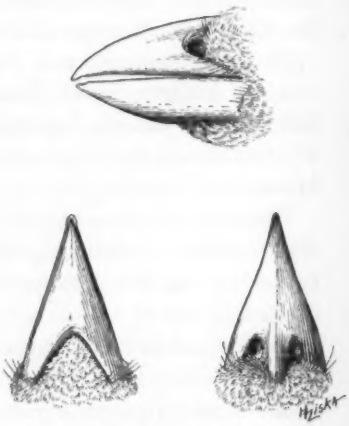
Thraupis cyanoptera
156395



Thraupis sayaca sayaca
163588



Thraupis sayaca obscura
139791



Thraupis episcopus episcopus
126276

Distribution of Thraupis sayaca and its allies

synonym of *Tanagra cyanoptera* Vieillot. Sclater finds that *Tanagra sayaca* and *cyanoptera* occur together, *sayaca* in the more northerly districts, *cyanoptera* in the more southerly areas. *Tanagra sayaca,* he writes, has the lesser wing coverts dull greenish blue, never reaching the bright shining blue lesser wing coverts of *T. cyanoptera.* Because the juvenal plumage of both is similar, *Thraupis sayaca* has frequently been considered the immature of *T. cyanoptera.*

Thraupis sayaca is the commonest species of the genus in Brazil. *Tanagra caelestis* Swainson[1] (but not of Spix) is the adult male of *Tanagra sayaca* Linnaeus. Some authors have taken *Tanagra caelestis* Swainson for *Tanagra cyanoptera* Vieillot in immature plumage, but the birds are easily distinguishable through their difference in the formation of the bill.

Thraupis sayaca has a more slender, more compressed bill, whereas *Thraupis cyanoptera* has a thicker and broader bill. Nevertheless *Thraupis sayaca sayaca* and *Thraupis cyanoptera* resemble each other more closely in the formation of the bill than they resemble *Thraupis episcopus episcopus* and *Thraupis sayaca obscura. Thraupis episcopus* especially has a much narrower and more slender bill.

Observations by Carl Euler on the nest and eggs of *Tanagra sayaca* are given in the Journal für Ornithologie (1867). He writes that it "is found in all open regions . . . I found nests every year in gardens, coffee plantations, or in trees surrounding my house. The principal building material is the stem of the blossom, *Lippia urticoides.* The dried blossoms are still attached to the stem and used on the outside wall of the nest. They are beautifully and carefully woven in and out and are joined by many grasses and root fibers. The egg of this species is yellowish white with many brownish dots and spots, which are darker in parts. At the thick end of the egg there is a circle of fine black marks. The markings are so close that the ground color shows only occasionally."

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[1] 1841, Birds of Brazil and Mexico, Tab. 41.

Thraupis sayaca sayaca Linnaeus.

Tanagra sayaca LINNAEUS, 1766, Systema Natura, I, p. 316 (type locality "Brasilia") by subsequent designation E. M. B. Naumburg, 1923, Pernambuco,[1] northeast Brazil.

Sayacu marcgraf MARCGRAVIUS, 1648, Historiae rerum naturalium Brasiliae.

Tanagra sayaca BURMEISTER, 1856, Syst. Ueb., III, p. 176.

Tanagra sayaca PELZELN, 1869, Orn. Bras., Part III, p. 208.

Tanagra sayaca EULER, 1867, J. f. O., p. 410 (nest and eggs).

Tanagra coelestis SWAINSON, 1841, Orn. Br. of Brazil, t. 4 (♂ ad.).

Tanagra inornata SWAINSON, 1841, *loc. ignot.*—juv.!

Tanagra sanhacu NATTERER, Catag. MS.

Tanagra swainsoni GRAY, 1849, Gen. Birds, II, p. 364 (ex Swainson "*T. coelestis*," pl. 41).

Thraupis sayaca CABANIS, 1850–51, Mus. Hein. Pt. I, p. 28, J. f. O., 1856, p. 305.

Subspecific characters.—Greenish gray above, paler below especially in the middle of the belly. Flanks pale greenish. Wings and tail blackish, edged with greenish blue; lesser wing coverts edged with greenish blue, culmen plumbeous. Feet brown.

Because it seems desirable to have a specified type locality for *Thraupis sayaca sayaca* a bird of considerably widespread range in Brazil, the author formally proposes Pernambuco, northeastern Brazil, from which locality the American Museum has no specimens. The foregoing description was made from No. 163589, ♂ ad.; Bahia, Brazil, May 8, 1916; R. H. Beck. Wing,[2] 94.5; tail, 70; exposed culmen, 13.5.

Specimens examined—Brazil: Bahia—6 ♂, 2 ♀; Matto Grosso, —Urucum, 4 ♂, 5 ♀, 1 im., Chapada, 36 ♂, 38 ♀, Palmiras, Rio Taquary, 1 ♀; S. Paulo,—S. Sebastiao, 1 ♀, La Raiz, foot of Organ Mts., 2 ♀. Paraguay: Trinidad, 1 ♂, 1 ♀; Fort Wheeler, 1 ♂. Bolivia: Trinidad, Rio Mamore, 1 ♂; Lower Beni River, 1 ?.

Thraupis sayaca obscura, new subspecies.

Subspecific characters.—Similar to *Thraupis sayaca sayaca* of Bahia but larger, considerably darker above, somewhat darker below, lesser wing

[1] Through the kindness of Dr. Hellmayr, I have ascertained that the sole basis of *T. sayaca* is Marcgrave's account and he never visited the state of Bahia. His travels covered only the north central States, north of Sergipe.

[2] All measurements are given in millimeters and made with dividers, the wing retaining the curvature of its primaries as well as the bent position of the manus taken in drying.

coverts darker greenish blue as are also the edges of the wing and tail; wing and tail longer; culmen more slender and compressed.

Type.—No. 138334, Amer. Mus. Nat. Hist.; ♂ ad.; Parotani, Dept. Cochabamba, Bolivia; alt. 8800 ft.; June 28, 1915; Miller and Boyle. Wing, 102.5, tail, 77, exposed culmen, 11.

Specimens examined—Bolivia: Department of Cochabamba,—Parotani, 5 ♂, 6 ♀; Todos Santos, 1 ♂, 4 ♀, Tujma, 3 ♂, Vinto, 1 ♂, 1 ♀; Department of Santa Cruz,—Vermejo, 1 ♂, California, 1 ♂, 2 ♀, Valle Grande, 1 ♂, Chilon, 2 ♂, Valle Grande, 1 ♂; Department of Sucre,—Rio Cachimayo, 3 ♂, Rio Pilcomayo, 2 ♂, Pulque, 1 ♂; Apolobamba, 1 ♂, 1 ♀. Argentina: Province of Salta,—Embarcacion, 2 ♀; Province of Tucuman,—Tafi Trail, 2 ♂, 3 ♀, Sariemento, 2 ♂, above San Pablo, 4 ♂, 1 ♀; Province of Santiago del Estero,— Suncho Corral, 1 ♀; Province of Missiones,—Puerto Segundo, 1 ♂; Province of Buenos Aires,—2 ♂, Barracas al Sur, 1 ♀.

Thraupis cyanoptera (Vieillot).

Saltator cyanopterus Vieillot, 1817, Nouv. Dict. XIV, p. 104 (descr. orig. type ex "Bresil" in Mus. Paris) by subsequent designation E. M. B. Naumburg, Novo Friburgo, Prov. of Rio de Janeiro,[1] Brazil.

Tanagra prelatus LESSON, 1831 ("du Bresil," Coll. Delalande in Mus. Paris).

Tanagra virens STRICKLAND, 1847.

Tanagra argentata GRAY, 1849 (ex Swainson, "T. episcopus," pl. 39).

Specific characters.—Plain pale bluish gray with a greenish tinge above, below much paler especially in the central portion of the abdomen. The wings and tail are blackish edged with greenish blue, lesser wing coverts bright shining blue. Substitute type, No. 156395, Amer. Mus. Nat. Hist.; ♂ ad.; Novo Friburgo, Prov. of Rio de Janeiro, southeast Brazil, Salvin and Godman Coll. (O. S. and F. D. G.), in the American Museum. The foregoing description was made from a specimen in the American Museum of Natural History which may be regarded as a substitute type.

Specimens examined—Brazil: Therezopolis, Organ Mts., 3 ♂, 2 ♀; Prov. of Rio de Janeiro, Novo Friburgo, 1 ♂.

The female is similar to the adult male and not always distinguishable though often less brilliant in color with lesser wing coverts greenish blue.

[1] Dr. Hellmayr has informed me that the type was obtained by Delalande, who worked only in the vicinity of Rio de Janeiro.

The difficulty has been to decide whether specimens should be referred to this species or to *T. sayaca*, especially Bolivian and Argentine examples, where the blue of the lesser wing coverts is not so bright as in specimens from southern Brazil. Upon close examination I now find the Bolivian and Argentine examples separable as shown before.

Thraupis episcopus episcopus Linnæus.

Episcopus Avis BRISSON, 1760, Orn., III, p. 40.

Tanagra Episcopus LINNÆUS, 1766, Syst. Nat., ed. XII, p. 316 (ex Brisson, hab. "Brasilia"[1] [according to Berlepsch, 1910, Revision der Tanagriden, Brasilia is an error and he has substituted Cayenne,[2] Mus. Réaumur]), by subsequent designation E. M. B. Naumburg, Pará, Brazil.

Gracula glauca SPARRMANN (*patria non indic*).

Tanagra serioptera SWAINSON, 1838 (Demerara, Brit. Guiana).

Subspecific characters.—Head neck and underparts pale bluish gray, rather darker on back and scapulars, tinged with violet on rump and breast, wings and tail margined with blue-blackish in color, lesser wing coverts clear bluish white.

Substitute Type.—No. 128931, Amer. Mus. Nat. Hist.; ♂ ad.; Pará, Brazil, Oct. 9, 1905, coll. Emilia Snethlage. Wing, 88, tail, 65, exposed culmen, 13.5.

Specimens examined—British Guiana: Tumatumari, Potaro River, 2 ♂, 1 ♀, Rockstone, Essequibo River, 2 ♂; Minnehaha Creek, 1 ♂; Wismar, Demarara River, 1 ♂; Potaro Landing, 1 ♂. French Guiana, Approuague, 1 ♂; Brazil, Pará, 1 ♂; Faró on the Yamundá River, 1 ♀.

In the case of *Thraupis episcopus episcopus* I have also designated a substitute type as I have seen a specimen from Pará,[3] Brazil.

I need not enumerate the advantages of fixing type localities, but how far are we privileged in doing so? In the case of this group, three species closely allied are found to have had Brasilia as their

[1] "Habitat in Brasilia, unde Missa ad. D. de Chavigny and D. de Vergene, qui D. de Reaumur dono dederunt."

[2] Dr. Hellmayr informs me that Berlepsch is no doubt right in assuming that the original locality "Bresil" was a mistake. Reaumur had not a single species from "Para" (which at his time was a perfect *terra incognita* ornithologically) in his collection but many from Cayenne, French Guiana. The first Para birds were obtained by Spix about 1820. Dr. Hellmayr thinks that Brisson's type did not come from Para.

[3] Dr. Hellmayr has seen several.

MEASUREMENTS (EXTREMES AND AVERAGES)

	Wing	Tail	Exposed Culmen	Collection
Thraupis sayaca sayaca (males)				
Brazil: Bahia (6)	88.5–96. (91.9)	65. –70. (66.7)	12. –15. (13.1)	A. M. N. H.
" Matto Grosso, Urucum (4)	91. –64.5(93.)	63. –66.5(64.8)	12.5–14. (13.3)	"
" Matto Grosso, Chapada (36)	82.5–97. (88.6)	51. –68. (56.)	12. –14. (12.8)	"
Paraguay: Trinidad (1)	94.5	68.	12.5	"
" Fort Wheeler (1)	94.5	67.5	12.5	"
Thraupis sayaca sayaca (females)				
Brazil: Bahia (2)	90.5–92..(91)	66. –69. (67.5)	14. –15. (14.2)	A. M. N. H.
" La Raiz, ft. of Organ Mts. (2)	91.5–925(91.7)	65. –65.5(65.2)	13.5–15. (14.5)	"
" Sao Paulo, S. Sebastiao (1)	88.5	65.	14.	"
" Matto Grosso, Urucum (5)	85. –91. (87.)	59. –64.5(62.4)	11. –14. (12.9)	"
" Matto Grosso, Palmiras (1)	88	63.5	14.	"
" Matto Grosso, Chapada (38)	83.5–94. (88.1)	55. –69.5(63.1)	12. –14. (12.9)	"
Paraguay: Trinidad (1)	92.	67.5	14.	"
Thraupis sayaca obscura (males)				
Bolivia: Dept. Cochabamba, Parotani (5)	96. –102.5(97.6)	70. –77. (73.6)[1]	11.5–13. (12.)	A. M. N. H.
" Todos Santos (1)	93.	68.5[2]	12.	"
" Dept. Cochabamba, Tujma (3)	99. –99. (99.)	71. –74.5(72.7)	13. –13.5(13.)	"
" Dept. Cochabamba, Vinto (1)	99.	72.	12.	"
" Dept. Santa Cruz (5)[3]	95. –100. (97.5)	68.[2] –73. (72.4)	12.5–13. (12.6)	"
Bolivia: Dept. Sucre (6)[4]	94. –98.5(97.5)	70.5–76.5(73.3)	12. –13.5(12.5)	"
" Apolobamba (1)	97.5	71.5	15.	"
Argentina: Prov. of Tucuman, (8)[5]	90.5–98.5(94.8)	70. –73.5(71.2)	12. –13. (12.1)	"
" Buenos Aires (3)[6]	83.5–96. (91.3)	60. –73.5(67.6)	12. –14. (12.8)	"

[1] The tails of 3 specimens are very much worn, making them shorter.
[2] Tail much worn.

[3] The tails of 3 specimens are very much worn, making them

[2] Tail much worn.

MEASUREMENTS (EXTREMES AND AVERAGES)

	Wing	Tail	Exposed Culmen	Collection
Thraupis sayaca obscura (females)				
Bolivia: Dept. Cochabamba, Parotani (6)	91. –95. (93.8)	66. –72.5(69.8)	12. –12.5(12.4)	A. M. N. H.
" Todos Santos (4)	86.5–92.5(89.7)	62.5–68.5(66.3)	11.5–13.5(12.7)	"
" Vinto, (1)	96.5	70.	13.	"
" Dept. Santa Cruz, California (2)	92. –93. (92.5)	68. –70. (69.)	13. –13.5(13.3)	"
" Dept. Sucre, Rio Cachimayo, (4)	92. –96.5(94.3)	70.5–72. (71.2)	12. –12.5(12.2)	"
" Apolobamba, (1)	94.	67.	15.	"
Argentina: (7)[7]	87. –93.5(90.3)	63.5–70. (67.2)	12. –13. (12.6)	"
" Buenos Aires, Barracas al Sur (1)	91.5	66.5	13.	"
Thraupis cyanoptera				
Brazil: Therezopolis, Organ Mts. (3 ♂)				
" Prov. of Rio de Janeiro, Novo Friburgo (1 ♂)	94. –99. (95.8)	70. –72. (70.2)	13.5–15. (14.5)	A. M. N. H.
" Therezopolis, Organ Mts. (2 ♀)	81. –91.5(86.2)	67. –67.5(67.7)	13.5–14	"
Thraupis episcopus episcopus (males)				
British Guiana, (7)[8]	90. –98. (94.1)	64. –67. (65.5)	13. –14.5(13.7)	A. M. N. H.
French Guiana, Appronague, 1 ♂	90.5	61.5	13.	"
Brazil, Pará 1 ♂	88.	65.	13.5	"
British Guiana, Tumatumari R. 1 ♀	88.5	63.	14.5	"
Brazil, Faró on the Yamundá, 1 ♀	85.5	59.5	12.5	"

[3] Vermejo, California, Chilon and Valle Grande.
[4] Rio Cachimayo, Rio Pilcomayo and Pulque.
[5] Tafi Trail, Sacramento and above San Pablo.
[6] Buenos Aires, Puerto Segundo and Los Talas.
[7] Tafi Trail, and above San Pablo (Tucuman); Embarcacion (Salta); Suncho Corral (Santiago del Estero).
[8] Tumatumari, Potaro R., Rockstone, Essequibo R., Minnehaha Creek, Wismar, Demarara R., and Potaro Ldg.

type locality. *Thraupis sayaca* and *Thraupis cyanoptera* still have the type locality Brasilia, while *Thraupis episcopus* described from Brazil by Linnaeus has had its type locality changed to Cayenne by Berlepsch ('Revision of Tanagers') who considered Brazil an error. Is he justified in considering this an error when he himself gives the species as occurring in Pará, Brazil? Another point, —in recent years certain authorities have designated "Colombia", for example, as a type locality, but such an indefinite designation seems to me worse than useless.

There are decided advantages in designating and in having types to work with. They are definite individual specimens for comparison. One may say this is only an imaginary advantage, but it certainly helps to solve our problems more accurately. On the other hand, in many cases, topotypes are better than a faded type for which we have only a sentimental interest and which may confuse us considerably, particularly when brown feathers have turned reddish brown through age. The idea came to me while working on this group that it might well be advisable to have two characters of types, the true type and the substitute type. There might be a classification of types[1] as well as of species in ornithology and a specimen subsequently selected as a type might be called a substitute type.

American Museum of Nat. Hist., New York.

A NOTE ON THE JAPANESE QUAIL.

BY NAGAMICHI KURODA, C. F. A. O. U.

I. INTRODUCTION.

IT has hitherto been believed by most ornithologists that there occur two forms of the Quail in Japan, viz., *Coturnix coturnix coturnix* (Linn.) and *C. coturnix japonica* Temm. & Schl. The

[1] This matter has been discussed at length by zoologists in the past. The most comprehensive classification is, perhaps, that of Schuchert and Buckman (Science, June 9, 1905, pp. 899–901, where some twenty kinds of types are proposed.—EDITOR.

opinion of Ogilvie-Grant on the occurrence of two forms in Japan may here be quoted (Cat. B. Brit. Mus., XXII, 1893, p. 231): "In Japan and China the migratory Quail (*C. coturnix*) inhabits the same tract of country during the breeding season as *C. japonica*, and there cannot be the slightest doubt that the two species frequently interbreed, with the result that all sorts of intermediate hybrids are produced. These intermediate plumages are most noticeable among the male hybrids. For instance, some have the dull brick-red throat of *C. japonica* and the black anchor-shaped mark of *C. coturnix*, others have only the upper two-thirds of the throat dull red and the lower third white, while again a third lot have, in addition, a black band down the center of the red part, and all kinds of intermediate stages between these three examples may be found". He also remarks on the rufous-throated birds often found in Europe as follows: "Equally also, though of secondary importance, *C. coturnix* interbreeds freely with the red-throated resident race (*C. capensis*) in South Africa and the islands surrounding the coast, and the results are seen in the many male birds from South Africa and Southern Europe, etc., in which the white parts on the sides of the head and throat are more or less suffused with the bright rufous chestnut of the resident bird."

On the contrary, Dr. Leonhard Stejneger, in his 'Remarks on Japanese Quails' (Proc. U. S. Nat. Mus., XVI, 1893, p. 765) advanced the view: "But this is hardly more than a postulate, and it is, in fact, somewhat difficult to see how such a hybridization can take place between a resident species and a subspecies (and he calls them only 'races'), the result to be found both among the residents and the migrants. The facts are that these so-called intermediates between *C. capensis* and *C. coturnix* are not only found in South Africa and Southern Europe, but that they are quite common in Central Europe, as evidenced by the detailed description of the throat color and markings by Naumann (Naturg. Vog. Deutsch., VI, 1833, pp. 578, 579, and particularly pp. 580–581). From his remarks it will be seen that the male Quails in Germany vary as much and almost in the same way as the Japanese and Chinese birds described by Mr. Ogilvie-Grant, and by him asserted to be hybrids." Concerning the Japanese specimens which were sent him by Prof. Ijima, he writes: "Looking over my

material I find nothing in it to contradict the supposition that the color and markings of the throat of the male Japanese bird are subject to as much individual variation as in the German bird, and I can see no reason for regarding these various plumages as 'intermediate stages' or 'hybrids.' "

In fact, Ogilvie-Grant did not describe the changes which take place in the feathers on the chin and throat of his so-called hybrids. In this respect, Dr. Stejneger remarks on a single European specimen as follows: "Our European series available at the present writing is very poor, but I wish to call attention to one specimen. U. S. Nat. Mus., No. 100,345; ♂; Koncza, Transsilvania, Hungary; August 28, 1883; J. von Csato coll. Throat coloration almost identical with Ringer's Nagasaki specimen, except that the lateral feathers are not marked with cinnamon-rufous. The lateral throat feathers are perceptibly lengthened and pointed, fully as much as the Korean example."

I have already pointed out that after a study of a large series of Japanese specimens in comparison with those from England, Italy, Caucasus, Rumania, etc., I have been led to the conclusion that there exists in Japan only one form of Quail, viz., *C. c. japonica.* The European Quail (*C. coturnix coturnix*) is found neither in Japan nor in Corea ('Dóbutsugaku Zasshi,' Vol. XXVI, Sept., 1914, pp. 435–440). The Japanese birds are all shorter in wing which is never much over 100 mm.

Dr. Ernest Hartert (Nov. Zool., XXIV, 1917, pp. 420–425) arrived at the same conclusion and remarked that "since *C. c. coturnix* is never found in East Asia, hybrids between it and *C. c. japonica do not* and cannot occur."

II. SEASONAL CHANGES AND INDIVIDUAL VARIATIONS OF THE THROAT FEATHERS IN THE JAPANESE QUAIL.

Although the result of my investigation of the Japanese Quails is, in the most part, in favour of Dr. Stejneger's view, yet it is in some respects different. The throat feathers of our specimens are of various colors and shapes, but this must be due to individual variation as Stejneger recognizes, and not "hybrid" or "intermediate stages," so-called by Ogilvie-Grant. If they were true

hybrids, there must occur in Japan not only the typical *C. c. japonica* and the so-called hybrids but also the typical *C. c. coturnix*.

Feathers on the chin and throat of our *C. c. japonica* are of various colors, such as dull-chestnut, pale chestnut, gray chestnut, dark vinaceous-cinnamon, and brick-red, which are, no doubt, the colors of the nuptial plumage. In my cage-birds, I observe this change of coloration of the feathers from the middle of May each year! But all males are not destined to become red-throated in summer; as this change takes place only after two or three years. Possibly old males have pale-chestnut throats even in winter, which, however, grow deeper in tone in summer. Again, some old females become pale-chestnut throated in summer but this is not so frequent as in the case of males. Feathers of the throat with red color are rounded, while those with other colors are lanceolate, the former being the nuptial plumage of the adult in summer, and the latter being the winter plumage. Feathers transitory between summer and winter plumages are observable in what Ogilvie-Grant asserts to be hybrids!

Besides the colors of the throat which are different for individuals the shape of the lanceolate feathers on the sides of throat not described by Ogilvie-Grant is especially to be noted; they are lanceolate on the upper part of the throat and rounded on the lower. This peculiarity appears not only in the individual variations, but also in the seasonal changes. Toward May of each year, the lanceolate feathers of the throat are replaced by rounded nuptial ones. The lanceolate feathers on the sides of throat become shortened by abrasion of their tips and finally fall off. Next I observed *the spring partial molt* of the body, especially of the throat and flanks. By this molt there grow new rufous or chestnut feathers with round margins. Of course, the body and flanks appear rufous from the newly grown feathers. From September to October there occurs an *autumnal complete molt* in our wild Quail. By this molt I observed that the feathers fall off on all parts of the body, including head, throat, remiges and rectrices. The replaced new feathers are, no doubt, the winter or non-breeding plumage. The throat feathers also become lanceolate especially on the lateral portions. But in the cage birds which are fed on ground food, there takes place no autumnal complete molt,

so that the birds have always the rufous nuptial or breeding plumage throughout the year. Cage birds deposit as many eggs as the common hen in every season, but this depends on the quantity of dried fish—*Pseudorasbora parva* (Temm. & Schl.) or *Zacco platypus* (Temm. & Schl.)—contained in the ground food.

The red-throated type (without any trace of black) is rather rare; generally a black anchor band, black spots or irregular black marks, etc., are seen on the throat as in the European form; and this is due to individual variation as Dr. Stejneger remarks.

In the breeding season, the bills of most Quails become fully black; in other seasons, they are brownish horn color, blackish brown, or brown, etc.

III. A COMPARATIVE STUDY ON THE EASTERN AND EUROPEAN QUAILS.

The following is the result of measurements of the Japanese, Corean and south Manchurian specimens preserved in the Zoological Institute, Science College, Tokyo Imperial University and those in my collection:

Loc.	Sex	Culmen	Wing	Tail	Tarsus	Total length	
		mm.	mm.	mm.	mm.	mm.	mm.
Hokkaido	4 ♂'s	13.5	97.5–100.5	35.5–38.5	26.5–28	—	
Hondo	45 ♂'s	12.5–14	91 –102	35 –42.5	25.5–30.5	—	
do.	41 ♀s	13 –14	91.5–104	37.5–43	25 –30.5	—	
Shikoku	6 ♂'s	12.5–13	95.5–98.5	37 –40	26 –28	—	
do.	2 ♀s	12.5–14	97.5–101	41 –42.5	27	—	
Kiusiu	1 ♀	13	100.5	39.5	27.5	—	
Corea	1 ♀	12.5	95	40	26	—	
S. Manchuria	9 ♂'s	11.5–14	93 –100	34.5–40	23.5–27	173–180	
S. Manchuria	11 ♀s	12 –14.5	95 –100	31 –37	24.5–27	172–190	

The limits of measurements in the above table are:

Sixty-four males, culmen 11.5–14 mm., wing 91–102 mm., tail 34.5–42.5 mm., tarsus 23.5–30.5 mm.

Fifty-six females, culmen 12–14.5 mm., wing 91.5–104 mm., tail 31–43 mm., tarsus 24.5–30.5 mm.

Dr. Hartert gives the measurements of the two forms as follows:—"The adult female in spring and summer is so much like that of

C. c. coturnix that I am unable to give constant distinguishing characters, though *C. c. japonica* is generally smaller: wings, ♂ 98–102, ♀ 100–106, against ♂ 104–115, ♀ 106–117 mm. in *C. c. coturnix.*" (Nov. Zool., XXIV, 1917, pp. 421–422).

The measurements with the notes on the color and shape of throat feathers and color of bills of the European *C. c. coturnix* which are preserved in my own collection follow:

	Locality	Date	Sex	Culmen	Wing	Tail	Tarsus
1	England	—	♂	13.5 mm.	105.5 mm.	39 mm.	28.5 mm.
2	do.	—	♀	13.5 "	109 "	40.5 "	23.5 "
3	Italy	April	♂	13.5 "	103 "	38 "	29 "
4	do.	do.	♂	14.5 "	107 "	39.5 "	27.5 "
5	Caucasus	March	♂	13.5 "	105.5 "	36.5 "	28 "
6	do.	April	♂	14 "	110 "	38 "	28 "
7	do.	May	♀	14 "	106 "	36.5 "	26 "
8	do.	do.	♀	13.5 "	104.5 "	38 "	27.5 "
9	do.	March	♀	13.5 "	104.5 "	37.5 "	26 "
10	Astrakhan, Russia	May	♂	14 "	106.5 "	41 "	28 "
11	Astrakhan, Russia	May	♀	14 "	111.5 "	38.5 "	29 "
12	Astrakhan, Russia	May	♀	13.5 "	105.5 "	36.5 "	26 "
13	Rumania	April	♀	14 "	109 "	37 "	30 "
14	do.	do.	♀	13.5 "	106 "	38 "	28 "

Color and shape of throat feathers and color of bills as follows:

1 Nearly rounded and pale buffy white with indistinct black anchor mark on middle of throat; bill brownish horn.

2 All rounded and nearly white; bill brownish white.

3 All rounded and nearly white with grayish black mark on middle of throat; bill brownish black.

4 Rounded and nearly white with narrow blackish band on middle; bill black.

5 Rounded with a large black patch on middle, side of the black patch with white and chestnut spots; bill black.

6 Rounded with a dark brownish black patch on middle; bill brownish black. Like *japonica.*

7 Same as the preceding male, but the lateral throat buffy; bill brownish horn color.

8 Rounded with dark chestnut spots; bill brownish black. Like *japonica.*

9 Nearly rounded with a pale chestnut anchor patch; bill black.

10 Rounded and gray chestnut with white shafts, a narrow black band on middle; bill blackish brown. Like *japonica*.

11 Comparatively long but not lanceolate, with buffy color bill; brownish horn color.

12 Same as the preceding female, but color of throat nearly white; bill brownish horn.

13 Nearly rounded with a narrow central streak, other parts and cheeks chestnut-red with white shafts; bill brownish black. Like *japonica*.

14 Rounded with a narrow pale blackish streak, two brownish red rings on lower throat, other parts white; bill brownish-black.

Thus the limits are:

Six males: Culmen 13.5–14.5 mm., wing 103–110 mm., tail 36.5–41 mm., tarsus 27.5–29 mm.

Eight females: Culmen 13.5–14 mm., wing 104.5–111.5 mm., tail 36.5–40.5 mm., tarsus 23.5–30 mm.

The length of wing of the European specimens before me is somewhat shorter on an average than the measurements given by Dr. Hartert (see antea). This is probably due to the fact that the number of specimens examined by me is far less than that of Dr. Hartert.

In my investigation, a series from Europe was available, none of which, however, had throat feathers so lengthened and pointed as the Japanese and other eastern birds.

As regards the elongated throat feathers of the eastern birds, Dr. Stejneger says: "Concerning the exact significance of the elongated throat feathers in the eastern birds, I have no well-founded theory to offer, but it seems to me as if there might be only a strong tendency toward the development of a 'beard' in the eastern form, with an individual variation in this respect similar to the throat coloration." In the case of the eastern form, my view wholly agrees with that of Dr. Stejneger. I think, moreover, that the European form with elongated throat feathers would probably be a very rare case.

IV. CONCLUSION.

By this study it is now settled that the Japanese and other eastern Quails are of only one form, so that the European *C. c. coturnix* should be omitted from the list of Japanese birds.

To show the key to the two forms:

(A). Wing: 91–104 mm. (106, after Hartert).

(a). Feathers on chin and throat dull brick-red or dark vinaceous-cinnamon, sometimes with a black anchor band situated as in *coturnix* ♂.....*C. c. japonica*, ♂ æstiv.

(b). Feathers on chin and upper side of throat lanceolate, generally whitish. Feathers on the lower parts rounded, some specimens with a blackish brown band passing down the middle of throat. *C. c. japonica*, ♂ hiem.

(c). Feathers on chin and sides of throat elongated and lanceolate, usually margined on outer or both webs with rufous or blackish. No black median band.....*C. c. japonica*, ♀ ad.

(B). Wing: 103–117 mm. (after Hartert).

(d). Feathers on chin and throat whitish or buffish, short and rounded, with a black anchor shaped band commencing on chin and passing down the middle of throat. *C. c. coturnix*, ♂ ad.

(e). Feathers on chin and sides of throat white, short and rounded. Generally no black band down the middle of throat, sometimes with an indistinct blackish or pale chestnut median band.....*C. c. coturnix*, ♀ ad.

C. c. japonica is distributed as follows:

"East Siberia from Dauria (Transbaikalia) to the Amur and Ussuriland, south to China and Japan. In winter to Hainan and Formosa, in small numbers to Burma and Bhutan" (Hartert, *l. c.*, p. 425).

Dr. Hartert mentioned that it is "not known from the Loo-Choo (Riu-Kiu) Islands." Mr. Uchida, however, reported the form from Amami-óshima, one of the northern Loo-Choo group. In Japan it occurs from Sakhalin Is. to Amami-óshima and Tsushima as well as Corean in the Peninsula.

In conclusion, I express my best thanks to the late Dr.I. Ijima, the late Mr. M. Namiye, and Mr. S. Uchida for their valuable advice in the course of the work.

Tokyo, Japan.

THE FORTY-FIRST STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.

BY T. S. PALMER.

THE Forty-first Stated Meeting of the American Ornithologists' Union was held in Cambridge, Massachusetts, October 8–12, 1923. This was the ninth meeting of the Union in Cambridge[1] and it proved to be one of the largest and most successful on record. Five days and evenings were fully occupied in transaction of business, discussion of scientific papers and enjoyment of the various social features generously provided by the Nuttall Club and the local Committee of Arrangements.

Attendance: The Fellows numbered 25 and included a single founder, Charles F. Batchelder, and five who were elected at the first meeting, Ruthven Deane, Jonathan Dwight, Geo. Bird Grinnell, John H. Sage and W. E. Saunders. More Members than usual were present, the number being also 25, including John Murdoch elected in 1883, while the list of Associates brought the total up to about 150. Sixteen States and the District of Columbia were represented, including all of those east of the Mississippi River and north of the Ohio and Potomac Rivers except four—Delaware, West Virginia, Indiana and Wisconsin—and in addition South Carolina, Texas and Canada were represented. One-fourth of the membership from Rhode Island and one-sixth of that from Massachusetts and the District of Columbia were in attendance. Among those who came from a distance were Miss Marian J. Pellew of South Carolina, George Finlay Simmons of Texas, and J. H. Fleming, W. E. Saunders, P. A. Taverner and Hoyes Lloyd from Canada.

[1] The first meeting was really held in Boston, Oct. 11–13, 1887, at the Boston Society of Natural History, 17 Active Members and 12 Associates being present. On the afternoon of the third day the Union visited Cambridge to inspect the Museum of Comparative Zoology and the collection of William Brewster. The second meeting in November, 1893, was held in the Nash Lecture Room of the Museum of Comparative Zoology where subsequent meetings have also been held. Owing to lack of hotel accommodations in Cambridge it has always been necessary for most of the members to stay in Boston where the headquarters this year, as in 1917, were at the Copley Square Hotel.

Business meetings: As usual Monday was devoted to routine business which occupied two sessions of the Council beginning at 10 A. M. and 2 P. M., a meeting of the Fellows at 4 P. M., and a meeting of the Fellows and Members at 8 P. M. The Council met at the residence of Mr. Batchelder, 7 Kirkland Street, and the afternoon and evening meetings were held at the Colonial Club on Quincy Street. At the meeting of the Fellows the Brewster Medal awarded biennially for the most meritorious publication on American birds was awarded to Arthur Cleveland Bent of Taunton, Massachusetts, for his 'Life Histories of North American Birds,' the second, third and fourth parts of which were published during the two years ending June 30, 1923.

At the meeting of the Fellows the single vacancy was filled by the election of Dr. Charles W. Townsend of Boston, Massachusetts.

At the evening meeting 25 Fellows and 22 Members were present and following the roll call and reading and approval of the minutes of the previous meeting, the report of the secretary was presented showing a total membership of about 1650 (for details see p. 135). The report of the treasurer showed the finances of the Union in a very satisfactory condition.

The election of officers for 1924 resulted as follows: President, Jonathan Dwight; Vice Presidents, Alexander Wetmore and Joseph Grinnell;[1] Secretary, T. S. Palmer; Treasurer, W. L. McAtee; Members of the Council, A. C. Bent, Ruthven Deane, J. H. Fleming, Harry C. Oberholser, W. H. Osgood, Charles W. Richmond and T. S. Roberts.

On recommendation of the Council one Honorary Fellow (transferred from the Corresponding list) 12 Corresponding Fellows anh 173 Associates were elected. This increase of 185 members thougd less than that of last year was one of the largest recorded at any meeting. In the election of 3 Members selected from about 1450 Associates, California was represented by Joseph S. Dixon, Kansas, by Charles D. Bunker and Texas by Geo. Finlay Simmons. There are no vacancies now in the class of Fellows, only 1 in that of Hon-

[1] This is the first time that two new Vice Presidents have been elected at the same meeting since the election of Coues and Ridgway at the initial meeting in 1883. Both candidates were elected simultaneously on the third ballot; of the 44 votes cast, Dr. Wetmore received 36 and Dr. Grinnell 27.

orary Fellows, 1 in that of Corresponding Fellows, and 3 in that of Members.

The Committee on Biography and Bibliography through its chairman Dr. Palmer presented a brief report of progress. Work on the 'Ten Year Index of The Auk' has been continued, the cards have been roughly arranged in a single alphabet and detailed arrangement is now under way. As soon as this work is completed the material will be ready for copying for the press. The committee has given some attention to the larger aspects of bibliography, has had correspondence and conferences on the subject with the National Research Council, has examined reports of other investigators regarding the present status of bibliographical work in this country, and has under consideration a tentative plan of a bibliography of bibliographies based on the decimal system. This outline is intended merely as a scheme in which can be inserted references to existing bibliographies thus rendering accessible an immense number of bibliographical citations already published.

Resolutions were adopted expressing the thanks of the Union to the President and Fellows of Harvard University, the Director of the University Museum, the Nuttall Ornithological Club, and the Boston Society of Natural History for various courtesies extended to the Members.

Public meetings: The meetings devoted to the presentation of scientific papers occupied three days, October 9, 10 and 11 from 9:30 A. M. to 5 P. M. with an hour and a half for luncheon which was served each day at the Colonial Club. Most of the sessions were held in the Nash Lecture Room of the University Museum, some of the illustrated papers were given in the Geological Lecture Hall, the technical papers on Wednesday morning in the Zoological Lecture Room and the motion pictures on Thursday afternoon in Pierce Hall opposite the Museum. Owing to the length of the program it was necessary to extend the hours of meeting by beginning each day at 9:30 A. M., to hold two simultaneous sessions on Wednesday morning, and to curtail all papers to thirty minutes or less. In this way more time than usual was allowed for discussion, although 40 papers were presented and four others read by title, making a program of exactly the same length as that of the Chicago meeting.

The meeting on Tuesday morning was devoted to papers of general interest, opening with a description by Dr. Chapman of the 'Arrangement of a Study Collection of Birds' followed by a brief review of the history of the Union by the Secretary. Dr. Townsend then discussed 'Mimicry of Voice in Birds;' Henry Oldys compared European and American song birds; Miss Catharine A. Mitchell presented a brief account of the State Bird preserve on Sanibel Island, Florida and Mr. T. Gilbert Pearson gave an outline of the results accomplished during his recent European trip in the interests of International Bird Protection.

Probably the papers of most interest were those grouped in four sessions devoted to exploration, bird banding, technical papers and motion pictures. On Wednesday afternoon an unusual series of reports of explorations was presented: 'Birds of the Kasai District, Belgian Congo'; by James P. Chapin, containing some of the results of the Congo Expedition sent out some years ago by the American Museum; 'Field Observations in the Hawaiian Bird Reservation, by Alex. Wetmore, forming a report of the recent Biological Survey Expedition to Laysan Island; the 'Cleveland Museum Expedition to the South Atlantic and Indian Oceans,' by George Finlay Simmons; and a progress report on the Whitney South Sea Expedition of the American Museum, by Robert Cushman Murphy. Thus in a single afternoon were presented illustrated accounts of the more important features of field work in the north and south Pacific, in the Belgian Congo, and a proposed two year voyage to the Indian Ocean beginning in November, 1923. Bird banding activities occupied the attention of a session on Wednesday morning and one of the two excursions on Friday. The widespread interest in this feature of bird work was shown by the large number of bird banders in attendance and the attention with which they followed the details presented by the various speakers. Naturally much of the discussion related to traps and methods of work while several of the papers were devoted to recounting experiences. Any doubt that scientific results may be obtained from banding was effectually dispelled by the statistical study presented by Nichols and Boulton of the data furnished by a series of banded Song Sparrows. Lincoln's 'Migration of the Mallard' was a distinct contribution to present knowledge of the

subject while the papers of Lyon and Baldwin contained many new facts of interest. With the large membership in the New England, Eastern and Inland Bird Banding Associations, the way is open for the acquisition of data which should throw much light on the times of arrival and departure of birds and their routes of migration and also furnish material for detailed studies of moult and changes in plumage.

The session devoted to technical papers proved to be quite as attractive as any of the popular sessions and the six papers presented aroused considerable discussion. 'Remarks on *Thraupis sayaca* and Its Allies' by Mrs. E. M. B. Naumburg brought up the question of types and type localities and resulted in the discussion of the modern practice of designating exact type localities and type specimens and the method of fixing type localities when the original one is not mentioned or is uncertain. Griscom's 'Life Zone Problems of the New York City Region' aroused discussion as to life zones and their boundaries and the interpretation of local data and whether the present grouping of species is the result of development or is due rather to climate, temperature, and influence of swamps, proximity to the coast, and other local conditions. Miller's 'Remarks on the Classification of Birds' brought up an inquiry as to what has been done in securing international cooperation and also the suggestion that the names of orders should end in "*formes*" and superfamilies in "*oidae*" so that uniform endings would indicate the position of the groups in the same way that the termination "*idae*" does in the case of families. Chapman's 'Criteria for the Determination of Subspecies' elicited comments on the practice of European ornithologists of reducing all representative forms except those most strongly differentiated to the status of subspecies. Wetmore's discussion of 'The Affinities of *Lawrencia nana*' showed that this bird is oscine and a true Vireo. Discussion elicited the fact of the presence of an aftershaft and that the song is apparently unknown. Murphy's discussion of 'The Forms of *Calonectris kuhli*' brought forth expressions of opinion from some of the members that certain of the forms were worthy of specific rank.

The motion pictures included three subjects of unusual interest —the Heath Hen, Kirtland's Warbler and Laysan birds. The

film of the Heath Hen was made by Job on Marthas Vineyard, Massachusetts, during the past summer in connection with studies of the bird made by Dr. Gross under the auspices of the Director of Fisheries and Game of Massachusetts. The pictures of Kirtland's Warbler made by James MacGillivray of Oscoda, Michigan, and presented through the courtesy of the Conservation Commission of Michigan by Nathan F. Leopold of Chicago, depicted with great clearness the nesting and feeding habits of one of the rarest of our Warblers. So tame were the birds that a female was shown taking insects from a child's hand only a few feet from the camera, while close range studies of the nest and movements of the bird were secured. The final motion picture was a film made by Donald R. Dickey of Pasadena, California, and presented by Dr. Wetmore showing the wonderful bird life on Laysan Island in the Hawaiian Island Bird Reservation. Portions of the film by way of contrast were shown with a slow motion camera and brought out in a wonderful manner the graceful flight of Man-o-war-birds, Albatrosses, Shearwaters and the remarkable flexibility of their wings. It was indeed a treat to see moving pictures of such rare species as the Laysan Rail, Laysan Finch and Kirtland's Warbler and especially of birds which are nearing extinction such as the Heath Hen now supposed to be reduced to less than 40 individuals, and the Laysan Teal of which only 14 are left.

The wide range of subjects on the program was shown by Mrs. Sage's account of 'Junior Audubon Work,' Childs' 'Trapping Devices for Bird Banding,' Davis' account of the 'Scranton Starling Roost' on the one hand, and Miller's 'Classification of Birds' and Chapman's 'Mutation vs. Evolution' on the other. Herrick's 1923 observations made at his eagle observatory in Ohio, Howell's 'Everglade Kite in Florida,' Brandt's 'Short-tailed Hawk in Florida,' Crosby's 'Birds of Southeastern Texas' and Holt's 'Birds of Mt. Itatiaya' all brought forth discussion of the life histories of interesting species. But perhaps none of them equalled in general interest such papers as Griscom's 'Notes on the Summer Birds of Newfoundland' containing an account not only of the avifauna but also of the country and the characteristics of the people.

Other events: The social gatherings included a popular lecture and conversazione at the Boston Society of Natural History on Tuesday evening, the annual dinner at the Colonial Club on Wednesday evening, and two excursions on Friday, one to Plum Island north of Boston to observe migratory birds, and the other to Cohasset south of Boston to inspect the bird banding stations in that vicinity. At the evening lecture Dr. A. A. Allen showed some of the results of his recent photographic work on waterfowl and also spoke of his investigations of the internal parasites of the Ruffed Grouse, an investigation that may lead to results of considerable scientific and economic importance.

At the annual dinner, attended by 160 members and guests, Dr. Witmer Stone presided and the principal entertainment was furnished by Dr. Charles W. Townsend who presented a series of 'Pourtraits of Celebrated Avian Historiens' with descriptions done in verse by one "Carolus Adexitumville" supposedly obtained from an old work in which the author displayed not only his keen perception of personal peculiarities but ingenuity in imitating the style of early authors. The veteran ornithologist C. J. Maynard also entertained the company with reminiscences of some of his early field experiences and described his first visit to Florida and that of Dr. J. A. Allen to the same State. Dr. H. C. Oberholzer presented greetings from some absent fellows whom he had recently met.—Henry W. Henshaw, Robert Ridgway and Otto Widmann.

The outings on Friday proved to be the most successful and largely attended of any of the excursions arranged for the annual meetings. The attendance of more than 100 was about equally divided between the two parties. Those who went to Plum Island had the pleasure of seeing such birds as Eider, Black-backed Gull, Lapland Longspur, Horned Lark, and Ipswich Sparrow, while at the banding stations at Cohasset were to be seen some of the most recent devices for trapping birds and the places where Whittle's observations on the change in plumage of the Purple Finch and other banding notes of special interest were made. On Friday evening a bird banding dinner was given at the Essex Hotel which was attended by about 75 members and guests of the New England Bird Banding Association. Several addresses were made including a review of the work of the association by

its president, Dr. Townsend, and a number of instructive pictures were shown by L. B. Fletcher illustrating recent bird banding activities.

Results accomplished: Among the results of the Cambridge meeting were the second award of the Brewster medal, provision for continuation of work on the 'Ten Year Index of The Auk' and for cooperation with the Zoological Society of London in the publication of the 'Zoological Record' for 1922, and demonstration of the various ways in which bird banding may be made to contribute valuable ornithological knowledge.

The Union has accepted the invitation of the Carnegie Museum to hold the next annual meeting in Pittsburgh, Pennsylvania, November 10–13, 1924. This will be the first meeting in Pittsburgh and the central location promises to bring together a large number of members from the East, North and Middle West.

PROGRAM.

(Papers are arranged in the order in which they were presented at the meeting. Those marked with an asterisk (*) were illustrated by lantern slides.)

TUESDAY MORNING.

Roll Call of Fellows and Members, Report of Business Meeting, Announcement of Result of Elections.

1. The Arrangement of a Study Collection of Birds. FRANK M. CHAPMAN, New York. (10 min.)
2. Looking Backward. T. S. PALMER, Washington, D. C. (15 min.)
3. Mimicry of Voice in Birds. CHARLES W. TOWNSEND, Boston, Mass. (20 min.)
4. European and American Song Birds Compared. HENRY OLDYS, Silver Spring, Md. (15 min.)
5. The Status of Sanibel Island, Florida, as a State Bird Preserve. MISS CATHARINE A. MITCHELL, Riverside, Ill. (10 min.)
6. *European Ornithologists and International Bird Protection. T. GILBERT PEARSON, New York. (20 min.)

TUESDAY AFTERNOON.

7. *The Everglade Kite in Florida. ARTHUR H. HOWELL, Washington, D. C. (25 min.)
8. *Ecological Comparisons and Parallels: Panama and Congo. JAMES P. CHAPIN, New York. (25 min.)
9. *Effect of Cultivation upon Changing Bird Populations. HENRY E. CHILDS, E. Providence, R. I. (20 min.)

10. *Bird Banding Experiences. T. E. MUSSELMAN, Quincy, Ill. (30 min.)
11. *An Eagle Observatory: Record for 1923. FRANCIS H. HERRICK, Cleveland, O. (20 min.)

WEDNESDAY MORNING—Bird Banding Session.

12. *Notes on a Scranton Starling Roost. R. N. DAVIS, Scranton, Pa. (15 min.)
13. *Trapping Devices for Bird Banding. HENRY E. CHILDS, E. Providence, R. I. (20 min.)
14. Some Bird Banding Experiences. B. S. BOWDISH, Demarest, N. J. (20 min.)
15. Midsummer Song Sparrows: A Statistical Study of Banding Data. JOHN T. NICHOLS and RUDYERD BOULTON, New York. (20 min.)
16. *The Migration of the Mallard (as shown by banding data). FREDERICK C. LINCOLN, Washington, D. C. (15 min.)
17. *Experiences in Bird Banding. W. I. LYON, Waukegan, Ill. (30 min.)
18. *Scientific Results from Bird Banding. S. PRENTISS BALDWIN, Cleveland, O. (30 min.)

WEDNESDAY MORNING—Technical Session.

19. The Affinities of *Lawrencia nana*. ALEXANDER WETMORE, Washington, D. C. (10 min.)
20. Remarks on *Thraupis sayaca* and its Allies. MRS. ELSIE M. B. NAUMBURG, New York. (15 min.)
21. Life Zone Problems of the New York City Region. LUDLOW GRISCOM, New York. (20 min.)
22. Remarks on the Classification of Birds. W. DEW. MILLER, New York. (30 min.)
23. Criteria for the Determination of Subspecies in Systematic Ornithology. FRANK M. CHAPMAN, New York. (20 min.)
24. The Forms and Representatives of *Calonectris kuhli*. ROBERT CUSHMAN MURPHY, New York. (10 min.)

WEDNESDAY AFTERNOON.

25. *The Heath Hen on Marthas Vineyard. ALFRED O. GROSS, Brunswick, Maine. (30 min.)
26. *Birds of the Kasai District, Belgian Congo. JAMES P. CHAPIN, New York. (20 min.)
27. *Field Observations in the Hawaiian Bird Reservation. ALEXANDER WETMORE, Washington, D. C. (30 min.)
28. *The Cleveland Museum Expedition to the South Atlantic and Indian Oceans. GEO. FINLAY SIMMONS, Austin, Tex. (20 min.)
29. *Report on the Progress of the Whitney South Sea Expedition. ROBERT CUSHMAN MURPHY, New York. (45 min.)

THURSDAY MORNING.

30. The Junior Audubon Work on Long Island. MRS. MARY S. SAGE, New York. (15 min.)
31. *Notes on the Summer Birds of Newfoundland. LUDLOW GRISCOM, New York. (30 min.)
32. *The Nesting of the Short-tailed Hawk in Florida. HERBERT W. BRANDT, Cleveland, O. Presented by ARTHUR H. HOWELL, Washington, D. C. (15 min.)
33. *Mutation vs. Evolution by Environment in Birds. FRANK M. CHAPMAN, New York (20 min.)
34. Notes on the Non-breeding Birds of Southeastern Texas. MAUNSELL S. CROSBY, Rhinebeck, N. Y. (20 min.)
35. The Birds of Mt. Itatiaya. ERNEST G. HOLT, Montgomery, Ala. Presented by MRS. ELSIE M. B. NAUMBURG, New York. (15 min.)
36. Notes on American Oystercatchers. ROBERT CUSHMAN MURPHY, New York. (15 min.)
37. A Neglected Bird Paradise. HARRY C. OBERHOLSER, Washington, D. C. (Read by title.)
38. Experiences among the Breeding Shorebirds of Great Salt Lake, Utah. HERBERT W. BRANDT, Cleveland, O. (Read by title.)
39. Colorado Anatidae. W. H. BERGTOLD, Denver, Col. (Read by title.)
40. Vagaries of Bird Migration. P. B. PEABODY, Blue Rapids, Kans. (Read by title.)

THURSDAY AFTERNOON—Motion Pictures.

41. Kirtland's Warbler in its Summer Home. (Exhibition of film made by James McGillivray, Oscoda, Mich.) Presented by NATHAN F. LEOPOLD, JR., Chicago, Ill. (30 min.)
42. The Vanishing Heath Hen. HERBERT K. JOB, West Haven, Conn. (15 min.)
43. Home Life of Common Birds. HERBERT K. JOB, West Haven, Conn. (30 min.).
44. The Birds of Laysan. (Exhibition of film made by Donald R. Dickey, Pasadena, Calif.) Presented by ALEXANDER WETMORE, Washington, D. C. (30 min.)

FELLOWS AND MEMBERS PRESENT.

FELLOWS:—A. A. Allen, Glover M. Allen, Outram Bangs, Charles F. Batchelder, A. C. Bent, J. P. Chapin, F. M. Chapman, Ruthven Deane, Jonathan Dwight, J. H. Fleming, E. H. Forbush, L. A. Fuertes, Geo. Bird Grinnell, W. L. McAtee, W. D. W. Miller, R. C. Murphy, Harry C. Oberholser, T. S. Palmer, C. W. Richmond, John H. Sage, W. E. Saunders, Witmer Stone, P. A. Taverner, C. W. Townsend, Alexander Wetmore. —Total 25.

MEMBERS:—F. H. Allen, S. Prentiss Baldwin, Thomas Barbour, Frank Bond, W. Sprague Brooks, Hubert L. Clark, Walter Deane, John A. Farley, Ludlow Griscom, Alfred O. Gross, F. Seymour Hersey, A. H. Howell, Herbert K. Job, F. H. Kennard, F. C. Lincoln, John Murdoch, A. H. Norton, T. Gilbert Pearson, Thomas E. Penard, J. L. Peters, S. N. Rhoads, Charles H. Rogers, Geo. Finlay Simmons, B. H. Swales, Winsor M. Tyler. —Total 25.

ELECTION OF FELLOWS, MEMBERS AND ASSOCIATES.

FELLOW:

DR. CHARLES WENDELL TOWNSEND, 98 Pinckney St., Boston, Mass.

HONORARY FELLOW:

ROBERT HALL, Tasmanian Museum, Hobart, Tasmania.

CORRESPONDING FELLOWS—12:

MAX BARTELS, Pasir Datar, Halte Tjisaat, Preanger, Java.
J. BERLIOZ, Museum d'Histoire Naturelle, 55 Rue de Buffon, Paris, France.
MARCEL DE CONTRERAS, 52 Place Georges Brugmann, Brussels, Belgium.
CAPT. HUGH STEUART GLADSTONE, Capenoch, Thornhill, Dumfriesshire, Scotland.
HERMANN GROTE, Wiesbadenerstrasse 4, Berlin-Friedenau, Germany.
DR. ALFRED LAUBMANN, Zool. Staatssammlung, Neuhauser-Strasse 51, Munich, Germany.
LOUIS LAUANDEN, Villa Jouvence, 12 Rue de Cronstadt, Tunis, Tunisia.
FRIEDRICH VON LUCANUS, Lessing-Strasse 32, Berlin, N. W. 23, Germany.
WALTER REGINALD BROOK OLIVER, Director Dominion Museum, Wellington, N. Z.
H. T. L. SHANNING, Stavanger Museum, Stavanger, Norway.
EUGENE LOUIS SIMON, 16 Rue Villa Said, Paris 16e, France.
COUNT OTTO ZEDLITZ, Tofhult bei Kalfsjöholm, Västergötland, Sweden.

MEMBERS—3:

CHARLES DEAN BUNKER, Kansas University Museum, Lawrence, Kansas.
JOSEPH SCATTERGOOD DIXON, Museum Vertebrate Zoology, Berkeley, Calif.
GEORGE FINLAY SIMMONS, Austin, Texas.

ASSOCIATES—173:

The names of those Associates who qualify will appear in the annual Directory of Members in 'The Auk' for April.

REPORT OF THE SECRETARY.

BY T. S. PALMER.

THE year 1923, marking the completion of forty years of existence finds the American Ornithologists' Union, in an active and prosperous condition. The experiment of holding a meeting in the Middle West last year proved unusually successful not only in affording many of the members an opportunity of attending for the first time the sessions of the Union, but also in building up the membership in the West. Every State in the Mississippi Valley with a single exception has shown an increase in members most marked in Illinois, Iowa, Ohio, Missouri and Minnesota.

Membership.—The Union now has members in every State except Wyoming, and also in Alaska, Hawaii, Porto Rico, the Philippine Islands and in 34 foreign countries and colonies including 6 in North America and the West Indies, 4 in South America, 14 in Europe, 4 in Asia, 4 in Africa, and also in Tahiti and Australia; 8 Provinces of Canada and 5 States of Australia being represented in the list.

Year	Fellows	Retired Fellows	Honorary Fellows	Corresponding Fellows	Members	Associates	Total
1913	49	2	15	57	77	792	992
1922	49	5	25	87	91	1200	1457
1923	49	5	23	87	95	1393	1652

The total gain during the past decade has been about 660 and the increase for the past year, 195. The gain during the year included the election at the last annual meeting of 6 Corresponding Fellows and 269 Associates. This apparent increase was offset by losses of 19 by death, 39 by resignation, 24 by failure to qualify and a number of delinquencies. The deaths included those of 1 Fellow, 1 Honorary Fellow, 4 Corresponding Fellows and 13 Associates. The effort to increase the life membership has made little progress and the record of the year includes the death of 1 Life Associate. The foreign list notwithstanding 6 new members elected at the last meeting is smaller than last year since it now

contains 2 vacancies in the Honorary list and 13 in the Corresponding list.

Activities of Members abroad.—During the year 1923 a number of members have been engaged in field work or have visited foreign countries. Tropical America and the South Pacific have been the scene of labors of several active workers. Dr. Paul Bartsch has visited Santo Domingo and Watling Island, James P. Chapin and C. H. Rogers have collected in Panama, Wm. Beebe and John Tee Van have visited the Galapagos collecting on several of the islands. In South America, Dr. W. H. Osgood, H. P. Conover and J. T. Zimmer have collected in Chile and Argentina for the Field Museum and the American Museum has maintained an expedition in Ecuador. In the South Pacific, R. H. Beck has continued explorations for the American Museum and has recently transferred his base of operations from Tahiti to Samoa; Dr. Spencer Trotter has visited New Zealand and Dr. Casey Wood has made an extensive trip through the South Pacific stopping at Tahiti, Samoa, New Zealand, Australia and the Fiji Islands. Dr. Alex. Wetmore has had charge of an expedition of the Biological Survey to Laysan, Midway and Wake Islands. On the visit to Laysan he was accompanied by Donald R. Dickey who was successful in securing moving pictures of the seabird life on the Hawaiian Bird Reservation. N. Gist Gee continues his residence in Pekin and Dr. F. P. Metcalf has recently accepted an appointment at Nanking, China. During the summer Mr. T. Gilbert Pearson visited Europe in behalf of international bird protection and succeeded in interesting workers in several countries on the continent in the work of the committee. The international organization now includes representatives of 11 countries—the United States, Canada, England, Australia, France, Belgium, Holland, Italy, Hungary, Luxemburg and Norway.

The Journal.—The total number of complete sets of 'The Auk' now known is 200. Of these only 86 are in public libraries and the remainder in private ownership. A number of other sets lack only a few of the early volumes and as these come on the market from time to time additional sets may be completed. Much interest has been aroused among some of the younger members in securing back volumes and several complete sets have been built up during the last two or three years.

Museum collections.—In the last report reference was made to the inquiry regarding the completeness of the collections of birds in American museums and it was estimated that about 250 of the 2810 genera recognized in Sharpe's 'Hand List' (not counting extinct groups) were unrepresented in the collections in this country. Work along this line has been continued with the result that the list of the genera not at present represented in museums in America has been reduced to about 130. The British Museum and the Tring Museum are apparently the only ones in the world which have a smaller number of desiderata.

Papers of the Chicago Meeting.—Only a small proportion of the papers presented at a meeting of the Union appear in 'The Auk'. Some are scattered in other publications and a few are incorporated with other material and are printed under different titles. To complete the record of the meetings it is desirable that references should be given to the place of publication of such contributions as have appeared in print. About one-fourth of those presented at the Chicago Meeting ('Auk', XL, pp. 112–114), have thus far been published. Four of these, No. 3, Sheak's 'Observations on Struthious Birds,' No. 16, Ahrens' 'Bird Banding at Rossitten,' No. 18, Mrs. Reichenberger's 'Remarks on Methods in Measuring Birds,' and No. 37, DeLury's 'Bird Arrivals in Relation to Sunspots' were published in 'The Auk' for 1923 and six others have appeared elsewhere:

1. Hankinson, T. L., 'Sketch of the Wilson Ornithological Club, Wilson Bull., XXXIV, No. 4, pp. 215–218, Dec., 1922.
5. Ganier, A. F., 'Notes from the Tennessee Cumberlands', Wilson Bull., XXXV, No. 1, pp. 26–34, Mar., 1923.
10. Cordier, A. H., 'Some Phases of Bird Photography', Material incorporated in his recent book, 'Birds, their Photographs and Home Life.'
20. Chapman, F. M., 'Distribution of the Genus *Momotus*, Bull. Am. Mus. Nat. Hist., XLVIII, pp. 27–59, 1923.
21. Chapman, F. M., 'A Possible Mutant in the Genus Buarremon', Bull. Am. Mus. Nat. Hist., XLVIII, pp. 243–278, 1923.
29. Cooke, Miss M. T., 'What can be learned from a Bird Census', Material incorporated in 'Report of Bird Censuses in the United States, 1916–1920,' Bull. 1165, U. S. Dept. Agriculture, 1923.

DECEASED MEMBERS, 1922–1923

WALTER BRADFORD BARROWS,[1] Fellow, aged 68, died at East Lansing, Mich., Feb. 26, 1923.

JOHN HENRY GURNEY,[2] Honorary Fellow, aged 74, died at Keswick Hall, near Norwich, England, Nov. 15, 1922.

TADEUSZ CHROSTOWSKI, Corresponding Fellow, died in Brazil in 1923.

EDUARD BACHOFEN VON ECHT,[3] Corresponding Fellow, aged 92, died at Nussdorf, near Vienna, Austria, May 22, 1922.

HENRY JOHN ELWES, Corresponding Fellow, died in his 76th year at Colesborne, England, Nov. 26, 1922.

DON JOSÉ CASTULO ZELEDON,[4] Corresponding Fellow, aged 77, died at Turin, Italy, July 14, 1923.

WILLIAM W. ARNOLD,[5] Associate, died in his 80th year at Colorado Springs, Colo., Mar. 30, 1923.

JOB BARNARD,[6] Associate, died in his 79th year at Washington, D. C., Feb. 28, 1923.

MRS. JAMES C. BUZZELL, Associate, died at Bangor, Maine, in January, 1922.

FRANK MALLARY CARRYL, Associate, died in his 70th year at Nutley, N. J., April 3, 1923.

LEWIS DEXTER, Associate, aged 63, died at Boston, Mass., Aug. 19, 1923.

MRS. WILLIAM FALGER, Associate, died at Modesto, Calif., Aug. 2, 1923.

LANGDON GIBSON, Associate, died at Criehaven, near Rockland, Maine, Sept. 4, 1923.

JOHN BROOKS HENDERSON, Life Associate, died in his 53d year at Washington, D. C., Feb. 4, 1923.

JAMES HAYNES HILL, Associate, died in his 76th year at New London, Conn., Dec. 11, 1922.

JAMES HIBBERT LANGILLE,[7] Associate, died in his 82d year at Forest Glen, Md., April 9, 1923.

THOMAS LEO MCCONNELL,[8] Associate, died in his 40th year at Pittsburgh, Pa., Oct. 13, 1922.

MRS. HERBERT BRUCE MCINTIRE, Associate, died in Cambridge, Mass., in May, 1923.

HENRY ALBERT PATTINSON SMITH, Associate, aged 59, died at St. John, N. B., April 29, 1923.

[1] For obituary notice see 'Auk,' XL, pp. 376–377.
[2] " " " " " " pp. 718–719.
[3] " " " " " " p. 721.
[4] " " " " " " pp. 682–689.
[5] " " " " " " pp. 574–575.
[6] " " " " " " p. 377.
[7] " " " " " " pp. 572–573.
[8] " " " " " " pp. 721–722.

LOOKING BACKWARD.[1]

BY T. S. PALMER.

REMINISCENCE and retrospection may not be considered accompaniments of progress but at times it is well worth while to pause long enough to review the past in preparation for the future. Only in some such way is it possible to measure progress in the course we are traveling. Such a point has been reached by the American Ornithologists' Union and the completion of the fourth decade of its existence affords a fitting opportunity to summarize briefly the main features in its development and, in the words of Coues, to see how successful it has been in "bearing to others the torch received in earlier days."[2]

Forty years ago, in September, 1883, a little group of enthusiastic bird students met in New York to form the American Ornithologists' Union. Although modeled on the lines of the British Ornithologists' Union, which had been founded a quarter of a century previously, the A. O. U. was modified to meet American conditions and at the same time built on foundations broad enough to support an international organization. While the initial meeting was held in New York, the idea of the Union first took definite form in Cambridge, the home of the Nuttall Ornithological Club, and the Nuttall Club very generously bequeathed to the Union its journal and furnished the first editor as well.

In the years that have passed many changes have occurred, new workers have taken the places of earlier leaders and new lines of work then little dreamed of have since been developed. This is not the time or place to review the history of the Union in detail but merely to outline those features which have made it what it is today.

Officers.—In the forty years of its existence the Union has had thirteen presidents, thirteen vice presidents, three secretaries, five treasurers and two editors. Thirty-four Fellows have served on

[1] Presented at the 41st Stated Meeting of the Union in Cambridge, Mass., Oct. 9, 1923.

[2] Dedication in 'Key to North American Birds,' 2d ed., 1884.

the Council, thirty-one by election and three ex officio and eleven of these subsequently reached the presidency. Three presidents, J. A. Allen, D. G. Elliot and John H. Sage were elected without previous service as vice president and Dr. Allen held the office seven years, Elliot, Ridgway and Cory two years, and the others three. Dr. Allen also served the Union as editor for the twenty-eight years, 1883–1911 inclusive, and his successor, Dr, Stone, has successfully piloted 'The Auk' for the last twelve years. Other long terms of service were those of John H. Sage as secretary for the twenty-eight years, 1889–1917, Jonathan Dwight as treasurer for seventeen years, 1903–1920, and William Dutcher for sixteen years 1887–1903. Dr. Merriam is the only Fellow who has filled all four offices of secretary, treasurer, vice president and president. The Council originally consisting of the five regular officers and five additional members was increased to seven additional members under the new By-Laws adopted in 1887, later still further enlarged by making all ex-presidents ex officio members, reaching its maximum of twenty-one members in 1920. Dr. Allen was elected to the Council after he had served as president and before the adoption of the provision regarding ex-presidents, and Coues and Ridgway after they had served as vice presidents. Sage, Palmer and McAtee are the only members who have not been elected directly as Councilors. While the Union has never lost any of its regular officers by death during their terms of office, eleven of the thirty-four Fellows who have served on the Council are now deceased and of these only Geo. N. Lawrence and Thomas McIlwraith died after retiring from the Council.

Members.—It is interesting to notice that the original limitations on number and qualifications of members have been preserved practically as adopted at the first meeting. The only important changes have been the substitution of the designation Fellow for Active Member, Honorary Fellow for Foreign Member and Corresponding Fellow for Corresponding Member, the addition of a new class of Members in 1901, and Retired Fellows in 1910, and the extension of the residence of Associates to include both North and South America. Several efforts to increase the number of Fellows beyond 50 have resulted in the addition of a class of Members limited to 100. The original members designated as

Founders numbered 23 and at the first meeting elected 24 Active, 21 Foreign, 20 Corresponding and 87 Associate Members. Apparently all the candidates did not qualify as the total number of members reported at the beginning of the second meeting was 143 instead of 175. Five years later the total number had doubled but not until the 10th meeting in 1892 did the membership pass 500, not until the 32d meeting in 1914 did it reach 1000, and not until the 41st meeting in 1923 did it pass 1500. The present number is about 1650. The membership has increased regularly except during four years when decreases of ten were reported in 1901, 110 in 1906, 10 in 1911 and 326 in 1916, the last decrease following a change from autumn to spring meetings and a drastic revision of the list of delinquents. The total number of Fellows elected during the 40 years has been 92 of which 49 are now carried on the rolls as Fellows, five as Retired Fellows and one, Montague Chamberlain, as a Corresponding Fellow. Twenty-nine are dead, seven have resigned and one failed to qualify. Of those who resigned, H. B. Bailey, Prof. S. A. Forbes and Dr. F. W. Langdon are still living. The total number of Honorary Fellows elected has been 58, of whom 23 are still on the roll and 35 deceased. About 150 Members have been elected of whom 21 have been advanced to Fellows, 95 are still on the roll, 12 are deceased, and the others have dropped out or failed to qualify. On the average one Fellow, one Honorary Fellow and four Members have been elected each year since these classes were established.

Committees.—The committees of the Union naturally fall in three groups, routine, service and research. Routine committees, more or less temporary in character, include those on arrangements, auditing and resolutions, which are appointed for each meeting, and the special committees on constitution and by-laws and the Audubon Monument. Service committees include those on publications, preparation of 'The Auk' Indexes, and on bird protection. A number of research committees have been appointed from time to time, some of which have been very active while others have failed to function. At the first meeting the following 6 committees were appointed on Revision of Classification and Nomenclature of North American Birds, on Migration of Birds, on Avian Anatomy, on Oölogy, on the European House Sparrow and on Faunal Areas.

The committee on Nomenclature has been perhaps the most active of all the committees and its work has been most fully published. The investigations of the committees on migration, faunal areas or distribution, and the English Sparrow developed to such an extent that they soon outgrew the resources of the Union and upon the organization of the Division of Economic Ornithology in the United States Department of Agriculture the material which they had collected was turned over to that office and subsequently published. The committee on Avian Anatomy continued to make reports for several years but the committee on Oölogy apparently lapsed into innocuous desuetude. At the early meetings extended reports were made by each of the committees and their consideration occupied a considerable part of the business sessions.

Publications.—The publications of the Union include 40 volumes of 'The Auk', with two general Indexes; six separate volumes, and several smaller miscellaneous publications. 'The Auk' alone includes 19,875[1] pages (plus 1262 pages of membership lists and contents) and the entire series of publications would easily fill a seven foot shelf. The separate volumes comprise three editions of the 'Check List of North American Birds' issued in 1886, 1895 and 1910, and three reports based on the early work of the A. O. U. committees but published by other organizations, viz., bulletins on the 'English Sparrow' and 'Bird Migration in the Mississippi Valley' issued as Bulletins 1 and 2 of the Division of Economic Ornithology and Mammalogy of the U. S. Department of Agriculture; and Belding's 'Land Birds of the Pacific District' published by the California Academy of Sciences. These substantial reports were based on the work of the committees on the English Sparrow and Geographic Distribution. The miscellaneous publications include two editions of the 'Code of Nomenclature,' an abridged edition of the first 'Check List' printed on one side of the page, a pocket edition of the 3d 'Check List,' a presidential address by Dr. J. A. Allen entitled 'A Seven Years Retrospect,' and two early bulletins on bird protection originally issued in 'Science' and published in separate form by 'Forest and Stream.'

Publications about the Union include the series of official reports of the annual meetings which have been included regularly in

[1] The figures were carefully checked; those given on p. 717 of October 1923 'Auk were in part estimated and the number of volumes there credited to Dr. Allen should be 28 instead of 26.—EDITOR

'The Auk,' accounts of the early meetings, some of them quite full, which appeared in 'Forest and Stream,' the 'Ornithologist and Oologist,' 'Science,' and the 'American Naturalist' and reports of recent ones in 'Bird Lore,' and of the Chicago meeting in 'The Wilson Bulletin.' An account of the Union and its work prepared by Dr. J. A. Allen was published in 'Bird Lore' for 1899 and a later one by the Secretary in the 'American Museum Journal' for 1918.

Meetings.—The meetings of the Union may perhaps be described as a general clearing house for activities in American ornithology. To these annual gatherings are brought the results of investigations already completed, accounts of investigations under way, and plans for future work. Members find the annual congress a convenient time to bring specimens, references or other material for comparison or verification in the museums or libraries. Points of contact are established which often have far reaching results in future investigations. Here the younger members become personally acquainted with men whom they have previously known only through publications and here the older men meet the younger workers and frequently improve the opportunities to select assistants or promising field collectors.

In the call for the first meeting one of the objects of the organization was well stated as "the promotion of social and scientific intercourse between American ornithologists." At first attention was so closely focused on organization and business that one of the members who attended the second or third meeting complained that there was no adequate opportunity for social intercourse outside the regular sessions. This was soon remedied by the daily luncheons, informal dinners, and later by the annual dinners. Routine business and reports of committees which at first occupied most of the general sessions have now been crowded into business sessions one day ahead of the public meetings, the meetings of the Council in the forenoon, of the Fellows in the afternoon and for elections and transaction of general business in the evening. The Friday following the public sessions is usually occupied by a field trip or visit to some point of ornithological interest which affords the members still better opportunity for social intercourse. The public meetings likewise have undergone a decided change or

evolution. The reading of local lists has been practically discontinued and papers illustrated simply by specimens have been restricted to technical sessions since the larger audiences make it impossible to demonstrate specimens satisfactorily. Still more marked are the improvements in illustration. Slides of mounted birds soon gave way to photographs of birds in the field, at first uncolored but now usually colored, then came moving pictures; until now an afternoon is usually devoted to the latest and best work of cinema artists and on the same screen under exactly the same conditions are shown the latest examples of work with the camera. On several occasions exhibitions of bird paintings and photographs have been held in connection with the meetings and have attracted unusual interest. In short every feature developed by any of the ornithological organizations has been adopted by the A. O. U. with the single exception of the extended camping outings arranged by our Australian confreres.

Looking back over the forty years the Union can well point with pride to its record in laying a firm foundation for still greater accomplishments in the future.

1939 Biltmore St., Washington, D. C.

A NEW RACE OF SPIZITORNIS PARULUS.

BY ALEXANDER WETMORE AND JAMES L. PETERS.

IN a recent paper[1] the junior author referred specimens of *Spizitornis parulus* taken in the Gobernación de Rio Negro, Argentina to the subspecies *patagonicus* (described by Hellmayr from Neuquen) though at the same time it was noted that birds from Bariloche and Rio Colorado, Rio Negro, as well as specimens from Potrerillos, Mendoza did not quite agree with Hellmayr's diagnosis. We have recently assembled a representative series of *Spizitornis parulus* from various parts of its range, including several fine examples of the typical form from Chile, and two specimens from General Roca, Rio Negro which may be considered as topotypes

[1] Notes on some summer birds from northern Patagonia, Bull. Mus. Comp. Zool., vol. 65, May, 1923, pp. 277–337.

of *S. p. patagonicus*. The material now before us leads us to revise earlier conclusions to the extent of referring Bariloche specimens to *S. p. parulus* (as, though not typical, they appear to be near that form) and to describe the bird from the eastern portion of Rio Negro as a new subspecies which we propose to call

Spizitornis parulus curatus, subsp. nov.

Characters.—Similar to *Spizitornis parulus parulus* (Kittlitz)[1] but paler above, with two distinct light wing-bars; dark auricular patch less sharply defined; upper breast whiter, less yellowish. Similar also to *S. p. patagonicus* Helmayr[2] but lower breast and abdomen distinctly yellowish; browner, less grayish above. Similar also to *S. p. aequatorialis* (Berlepsch and Taczanowski)[3] but grayer above, with crown much more heavily streaked with white.

Description.—Type, Cat. No. 85664, Museum of Comparative Zoology, male, from Rio Colorado, Gobernación de Rio Negro, Argentina, collected August 10, 1920, by J. L. Peters (orig. No. 2342). Forehead black, the feathers edged with white; crown feathers somewhat elongated, black, narrowly bordered internally with white, gray at base; sides of crown between mouse gray and deep mouse gray, this color extended to include the entire cervical and anterior interscapular regions; nasal plumes white; lores black; a white anteocular spot; anterior portion of upper eyelid black, this color prolonged posteriorly into a poorly defined line that borders the crown; posterior portion of the upper eyelid white, prolonged into a white line which loses itself on side of neck; lower eyelid white; auriculars black, edged on the outer web with white; lower back and rump paler than grayish olive; upper tail-coverts between grayish olive and deep grayish olive; wings hair brown externally, narrowly edged with whitish except on the outermost primary; proximal half of inner webs edged internally with tilleul buff; primary coverts darker than hair brown; median and lesser series blackish, tipped with white to form two white wing-bars; outermost feather of the median coverts externally edged with whitish; bend of wing and under wing coverts pale chalcedony yellow; tail in general hair brown; central pair of rectrices chaetura drab with faint paler edges; outer web and tip of outer rectrix white, the terminal portion of the outer web clouded with hair brown; shafts of rectrices white on under side; throat, sides of head and breast white with black mesial streaks; flanks massicott yellow, with black mesial streaks that become obscured posteriorly;

[1] *Muscicapa Parulus* Kittlitz, Mem. Acad. Imp. Sci. St. Pétersbourg, vol. I, 1831, p. 190. (Concepcion and Valparaiso, Chile.)

[2] *Spizitornis parulus patagonicus* Hellmayr, Arch. f. Naturg., vol. 85, Nov., 1920, p. 51. (Neuquen, Gobernacion de Neuquen, Argentina.)

[3] *Anaeretes parulus aequatorialis* Berlepsch and Taczanowski, Proc. Zool. Soc. London, 1884, p 296. (Cechce, western Ecuador.)

abdomen straw yellow; under tail coverts marguerite yellow, the longest ones with dusky centers. Bill and feet black (in dried skin).

Measurements.—(In millimeters).—Males, 6 specimens: wing, 46.0–49.2 (47.5); tail, 49.0–56 (52.5); culmen from base, 10.0–11.5 (10.6); tarsus, 17.5–18.7 (18.1).

Females, 4 specimens: Wing, 45.0–48.2 (46.3); tail, 46.3–52.4 (50.0); culmen from base, 10.0–11.0 (10.4); tarsus, 17.5–18.7 (17.6).

Type, male, wing, 46.0; tail, 52.0; culmen from base, 10.5; tarsus, 17.5.

Range.—Argentina, from Mendoza to Córdoba and eastern Pampa, south into eastern Rio Negro, possibly to eastern Chubut.

Remarks.—In working out the distribution of this new form the most puzzling point that we have encountered has been the presence of *S. p. patagonicus*, a race with a white, or at most very pale yellow abdomen, apparently isolated in northwestern Rio Negro and southern Neuquen. From present information we believe that *patagonicus* is confined to the more arid portions of the upper Rio Negro and the lower Neuquen and Limay valleys. To the west and southwest it tends towards *parulus* and to the north and east it intergrades with *curatus*. A specimen from Victorica, Pampa with the abdomen very pale yellow is apparently intermediate between the two latter, while skins from Córdoba and Mendoza agree best with *curatus*. No specimens have been seen from San Luis. A skin collected by Durnford marked "Patagonia" may have come from eastern Chubut but this is uncertain.[1] In the arid central portion of Rio Negro *Spizitornis* is absent above an altitude of 1,500 feet, as it was not found during intensive work at Maquinchao and Huanaluan, but it appears again near Lake Nahuel Huapi, apparently from the westward, since skins from Bariloche, while not typical, are best referred to *S. p. parulus* of Chile.

U. S. Biological Survey, Washington, D. C.

[1] See Ibis, 1877, p. 34.

A NEW SONG SPARROW FROM VIRGINIA.

BY W. E. CLYDE TODD.

IN the course of a critical revision of the Song Sparrows of eastern North America, undertaken in connection with my studies of the birds of Labrador and Hudson Bay, and which will appear in my forthcoming report on the ornithology of this region, an apparently new race from the coast of Virginia has been found. This I propose to call

Melospiza melodia atlantica, subsp. nov.

Type, No. 294,442, Collection U. S. National Museum, adult male; Smith's Island, Virginia, May 25, 1898; William Palmer.

Subspecific characters.—Similar to *Melospiza melodia melodia* of the Atlantic slope region, but much grayer above, with the blackish streaking more distinct, and the reddish brown feather-edging reduced to a minimum. More nearly resembling *Melospiza melodia juddi*, but more grayish above even than that form. Measurements of type: wing, 67 mm.; tail, 65; exposed culmen, 12; tarsus, 21.

Remarks.—The new race is represented by a series of twenty-one breeding birds (May and June) from Smith's Island and Cobb's Island, Virginia, collected by Messrs. Joseph H. Riley, Edward J. Brown, the late William Palmer, and Dr. Louis B. Bishop. In series it is strikingly different from *melodia*, but is to be separated from *juddi* only by being still more grayish than the average individual of that form. This grayish cast is a pronounced feature even in fall and winter specimens, as shown by a December bird from Virginia Beach (on the mainland), and by three specimens from Pea Island and vicinity, on the coast of North Carolina. While it is evidently a littoral race, the series at my command will not admit of working out its range with precision. No specimens from New Jersey have been examined, but two May specimens from Pocantico, New York, and one from Shelter Island, at the eastern end of Long Island, approach *atlantica* very closely, and suggest that it may eventually be found to inhabit the entire coast region from Long Island to North Carolina.

It appears that Palmer had fully intended to describe this form, and had even gone so far as to select a type-specimen. I am therefore choosing the same individual as the type. Dr. Bishop has also been aware of the distinctness of his birds from Cobb's Island, but has generously placed them at my disposal upon learning of my interest in the matter. I am further indebted to the authorities of the United States National Museum for the loan of the type series and for the privilege of describing the new race.

Carnegie Museum, Pittsburgh, Pa.

GENERAL NOTES.

Record of Brunnich's Murre for Lake Co., Ohio.—December 12, 1920, found me seated at the end of a stone breakwater extending far out into Lake Erie. Discovering what at first sight I took to be a small Duck swimming rapidly in from the open water, I laid flat on my stomach with field glass ready to determine the species. The closer the bird approached the more puzzled I became, until at last I could plainly see the pointed bill, the end of which looked as though "whittled" off with one stroke of a knife blade. The bird passed the end of the breakwater so closely I could plainly see the black feet paddling behind the body. The tail was not raised as in the Razor-billed Auk which closely resembles this species in color pattern. When I arose and the Murre made a dive, which, for distance under water, was astounding. This record is interesting because one was shot at this very spot in 1896 and is now preserved at Lake Erie College.—E. A. Doolittle, *Painesville, Ohio.*

The Songs of Leach's Petrel.—The nocturnal song of Leach's Petrel has been described by several observers, but it is so unusual in character that another attempt to describe it may be worth while. Another song of this bird, which seems to be a courtship song, has not, as far as I know, been described. During a visit of six days from July 30 to August 4, 1923, at the Life Saving Station at Outer Wood Island near Grand Manan, New Brunswick, I had ample opportunity to study these songs in the large breeding colony there.

The ordinary song was heard everywhere at night from the birds in the air and on the ground. The general theme or syllabication of this song did not vary, but the tones or pitch with which it was produced varied with the individual. Many songs were clear and melodious but some were harsh and rasping, and all ended with a sound as if of laughter or of a rapidly bouncing rubber ball. The song was executed with great speed, occupying in time only one and a half or two seconds, as closely as I could

estimate. The birds seemed to say *ipter-ipta, ut, ut, ut.* I have also written it down on different nights, *whipter-ipta, ha, ha, ha,* and *upter-upta, ha, ha, ha.* There was nothing indefinite or variable about the wording. It suggested a college yell of nocturnal sprites.

Another song, less complicated but of considerable interest, was heard several times and was called to my attention by Mr. Ernest Joy, one of the Life Saving men, an Associate of the American Ornithologists' Union, a member of the New England Bird Banding Association and a keen and accurate observer. The song may best be described by saying that it resembles the trilling of a toad. One that I traced to its source came from a burrow, where, besides the trilling, could be heard a gentle cooing or clucking sound which appeared to come from a second bird. The sounds ceased abruptly when the light of a lantern was flashed in the hole. Mr. Joy called this the mating song, and in this I think he is correct, for he said the trilling was heard much more commonly earlier in the season, and on several occasions when he had investigated, he had found two birds in the hole.

These songs are certainly among the weirdest and most unusual of bird songs, and, coming out of the darkness often from birds close at hand, the effect is indescribable.—CHARLES W. TOWNSEND, *98 Pinckney St., Boston, Mass.*

Bonaparte's Gull Summering near Perth Amboy, N. J.—A flock of about thirty Bonaparte's Gulls (*Larus philadelphia*) was seen on the Raritan River near Perth Amboy, N. J., by R. H. Howland, Rudyerd Boulton and the writer on July 28, 1923. I am informed by Ludlow Griscom of the American Museum of Natural History that other observers have reported them in the same locality in June, July and August.—CHARLES A. URNER, *Elizabeth, N. J.*

Caspian Tern (Sterna caspia) in Michigan.—Doctor Christofferson and myself spent Sept. 1–3 at Brevort Lake, Mackinac County, Mich. Immediately on our arrival we were attracted by a loud squawking and on investigating we discovered a flock of more than twenty Caspian Terns, old and young, on a sand bar just off the shore of the lake and almost directly in front of our cabin. We watched them every day and the old birds were continually bringing fish which they were feeding the young.

On September 2 on a sand bar farther up the lake we found another flock of more than thirty and here also the old birds were bringing food to the young. On this same bar were also nine Common Terns (*Sterna hirundo*); three Herring Gulls (*Larus argentatus*); three Ring-billed Gulls (*Larus delawarensis*); one Spotted Sandpiper (*Actitis macularia*) and one Least Sandpiper (*Pisobia minutilla*).

A farmer living at the lake informed us that the Caspian Terns had been there all summer. Brevort Lake is about a mile from the north shore of Lake Michigan.

Returning to the Soo Sept. 3, we stopped at Carp River and at its mouth saw one Caspian Tern with two Common Terns. Carp River is about ten miles from Brevort Lake across the St. Ignace Peninsula and empties into Lake Huron.—M. J. MAGEE, *Sault Ste. Marie, Mich.*

Note on the Cormorant (Phalacrocorax carbo).—Any evidence of the breeding of this vanishing bird on our coast is worth recording. On February 7, 1923, Mr. Allen T. Moses of North Head, Grand Manan, New Brunswick, shot one at that place and reported that a flock of about two hundred wintered there and that he believed they bred at White Horse Island at the mouth of Passamaquoddy Bay, north of Campobello Island. In July we were informed by a Passamaquoddy Indian that Cormorants still nested at this island although much less in numbers than in former days. Without being prompted, he said there were two kinds there, one having a white patch on the flank.

On July 25, 1923, we visited this island and found the sea cliffs painted white with Cormorant droppings, and we saw about twenty-five Cormorants. All flew away but two before we could identify them. One of these was plainly a Common Cormorant as it showed the white feathers on the lower sides of the face although no white spot on the flank was visible. The other bird was of the same size but devoid of markings.

The island is about three hundred yards long and half as broad, with cliffs of basaltic rock seventy or a hundred feet high, well adapted on the sea side for nests as there is a succession of shelves and flat-topped columns When we climbed about the cliffs, an adult Cormorant, apparently without markings, flew near us, and, later, an immature bird flew out of a cleft. Its breast was turned away so that we were unable to determine the species.

No Cormorant nests were found, although a few sticks and weed-stalks in places suggested nests of former years. A cloud of two or three hundred Herring Gulls rose over the island on our approach, but only two or three young Gulls on an outlying rock were to be seen. There were nesting depressions in the turf of the summit of the island, but no eggs or young. It was evident that the island had been repeatedly raided for eggs and young birds.

The keeper at Head Harbor Light, Campobello, some two miles to the south, told us that over a hundred Cormorants spent the winter about the island. These, like the birds at Grand Manan, were probably *carbo*, for *auritus* is not found in winter north of New Jersey.

It is well known that sea birds often return for some years to a former breeding place, even when persecution has prevented their nesting. Steps are being taken to guard this island, and it is to be hoped that the Common Cormorant may in time nest there undisturbed.—ROBIE W. TUFTS, *Wolfville, Nova Scotia* and CHARLES W. TOWNSEND, *Boston, Mass.*

A Florida Flamingo.—One day in company with Mr. Charles Dury I was looking through the interesting collection of birds in the Cuvier

Club, Cincinnati, Ohio, and saw a Flamingo. The record is No. 439 *Phoenicopterus ruber*, male; shot in Volusia County, Florida; bought at New Smyrna; presented by John S. Baker.

Mr. Dury, the president of the Cincinnati Society of Natural History, a competent ornithologist, who is in charge of the collections—and has been for almost, if not quite, half a century—was asked concerning the specimen. He said he recalled the circumstances. Mr. Baker was one of what the catalogue calls the "Florida party," the others being Col. L. A. Harris, H. C. Culbertson, and Mr. Dury. The record shows they made a collecting trip to Florida in 1875 and presented the specimens to the club. Mr. Baker bought the Flamingo from a man at New Smyrna, Volusia County, Florida, who killed it in that vicinity. Mr. Dury, himself, mounted it.

New Smyrna having been a vacation spot for me, I knew several old citizens who it occurred to me might know something of the history of the specimen. I wrote Dr. L. B. Bouchelle, of New Smyrna, a good friend, to ascertain what, if anything, he could learn about it.

He replied that Captain Frank Sams, his father-in-law, one of the pioneers of that place, who has since died, remembered a Flamingo killed near there a number of years ago by Captain R. S. Sheldon, his brother-in-law. He also remembered Mr. Baker and the others of the "Florida party."

Later, when at New Smyrna, I interviewed Captain Sheldon, a very interesting man, now well past "three score and ten" years. He said the Flamingo was killed at Shipyard Island, in the North Indian River, about one and one-fourth miles north of Turtle Mound. John Loud was with him. Loud died November 8, 1868. "I worked five or six hours to get it. I skinned and stuffed it, having learned from an Englishman, named Peters, who came up here before the Civil War, first with Sir Francis Sykes, and after the war with Lord Parker. He collected birds. It is the only Flamingo I ever saw in Florida. When running the blockade during the Civil War our headquarters was at Green Turtle Key in the Bahamas. There was one breeding colony about ten miles from there, so I came to know them very well. The young are good eating, as I know from having eaten them."

Both Captain Sams and Captain Sheldon knew the coast of Florida thoroughly. The former at one time was inspector of lighthouses.

Mr. Dury has a specimen in his own collection which he bought. The only record is "Killed in So. Florida (Keys ?)."

The following are some Florida records of the Flamingo, mainly supplied by Mr. A. H. Howell, of the U. S. Biological Survey.

Audubon in the 'Ornithological Biography,' V, p. 255 (1839) describes them as common at Pensacola in May, 1832.

George Wuerdemann, in the 'Smithsonian Report' for 1860, p. 426, has a letter dated Indian Key, Fla., August 27, 1857 in which he says that he is sending six skins to the Institute. The National Museum has had six

specimens from Indian Key collected by Wuerdemann, three of which are dated 1857 and are probably the ones above referred to.

D. D. Stone has an article in the 'Ornithologist and Oölogist,' X, p. 158, (1885) in which he mentions four captured alive at Warrington, Fla. in 1881.

Reginald Heber Howe, in 'Contributions to N. A. Ornithology,' I, p. 27, (1902) describes a flock of 500–1000 seen at Cape Sable, from which one specimen was secured.

C. P. Ryman in 'The Auk,' XXV, p. 313, (1908) records the taking of a specimen at Lake Worth in May, 1905.

Gen. George A. McCall describes the killing of four birds, old and young, on Anclote Key, thirty miles above the entrance to Hillsborough Bay, in 1827 and later [1828?], in his autobiographical volume, 'Letters from the Frontier,' (1868). (See Cassinia, 1912, p. 2.)—Amos W. Butler, *Indianapolis, Ind.*

American Egret in Albany Co., N. Y.—Two years ago it was my privilege to find and report the American Egret (*Casmerodius egretta*) in Albany County, N. Y. On July 25, 1923 it was my pleasure to find another specimen at the same place as that previously reported, the Watervliet Reservoir about thirteen miles west of the city of Albany. On this date, however, the Egret was accompanied by another bird apparently perfectly white, of similar appearance but about half its size.

Closer examination through an 8 power binocular revealed the fact that the legs and feet were greenish yellow, the tip of the bill was blackish and the tips of the primaries in flight were slaty in color, thus identifying it as the immature of the Little Blue Heron (*Florida caerula*). The birds kept rather closely together feeding at the edge of sandy bars. The Egret occasionally emitted a gutteral croak resembling slightly the quack of the Black Duck; the Little Blue Heron, however, was entirely silent. Both birds remained at the reservoir for several days; the Egret, however, was seen alone on the occasion of the last few visits. Attempts to secure photographs were not very successful.

Other unusual records for the season include the Arctic Three-toed Woodpecker (*Picoides arcticus*) observed at close range with binoculars April 27, 1923, and the White-winged Crossbill (*Loxia leucoptera*) April 5, 1923. The lateness of the date for the Woodpecker seemed to indicate that it might possibly stay to breed, and there was no evidence that it had been injured; but, it was not seen again.—Barnard S. Bronson, *State College for Teachers, Albany, N. Y.*

American Egret in New Hampshire.—On August 6, 1923, while driving along the Ocean Boulevard through Rye, New Hampshire, I saw an American Egret (*Casmerodius egretta*) in a fresh-water marsh. He was shy and could not be closely approached, but his large size, pure white color, bright yellow bill, and black legs made the identification definite.

About noon the next day, August 7, we found five birds of the same species on the beaches of the little estuary at Rye Harbor. At one time a Herring Gull was standing near them, and the vastly greater size of the Egrets was evident. I made an attempt to crawl through the marsh and secure one of the birds, but a belt of black mud prevented me from getting in range. A game warden, who appeared on the scene at the sound of my unsuccessful shots, informed me that the birds had been in that vicinity for a month or six weeks.—S. F. Blake, *Washington, D. C.*

White Herons at Lakehurst, N. J.—To me, accustomed to spending my summers in New England, this past season in the New Jersey Pine Barrens has been full of interest and novelty, chief place in the latter category being the presence in my "front yard," to-wit our little lake, of White Herons. They appeared about July 25, three Egrets and six Little Blues. The numbers of the latter were soon augmented, fifteen being the largest number seen at one time. As the sphagnum marshes about the irregular lake are quite extensive, I could not be sure that the numbers were not greater. But I am confident that there were but three Egrets. The latter left about Sept. 1, and the little ones on the 10th. All were quite tame while feeding. About sunset, or just after, they left nightly, flying east.

I am told these White Herons summer here regularly.—Lewis B. Woodruff, *Lakehurst, N. J.*

Long-billed Curlew (Numenius americanus) on Fishers Island, N. Y.—One of our game keepers saw a Long-billed Curlew, on September 10, 1923. We have never seen one here before and I know that it is a rare bird in New York. The keeper is familiar with the Hudsonian Curlew and was absolutely sure of the identity of the bird.—Harry L. Ferguson, *Fishers Island, N. Y.*

Recent Observations of the Long-billed Curlew at Cape Lookout, North Carolina.—For more than twenty years I have been spending my summers at Cape Lookout, North Carolina, making collections of specimens and notes on the fishes of that region, and incidentally I have kept somewhat in touch with its bird life.

Recently my attention has been called to a published statement (which I find accepted as fact), that the big Sickle-bill Curlew (*Numenius americanus*) had not been seen on the coast of North Carolina since 1885. (1919, Birds of North Carolina, Pearson, Brimley and Brimley.)

I note this with surprise, as, during the month of July, from 1903 to 1908 inclusive, I saw almost daily a flock of from 5 to 10 of these big Curlews fly from the region of Core Sound and spend the day feeding on the flats of Cape Lookout, and at the same time much larger flocks of the smaller Curlew (*Numenius hudsonicus*) made the same daily flights. Although I do

not recall ever having seen the two species in the same flock in making the flight, yet I have often watched them with my glasses, at a distance of two hundred yards or more, feeding together, and at such times there could be no question about the accuracy of the identification of this easily recognized bird.

During the years immediately following 1908 I was so intensively engaged in my fish work that I made few bird notes and cannot be so positive that I observed them.

However, on May 24, 1923, one of these big Curlews, which had just been shot, was brought to me on my houseboat at Cape Lookout. It had a wing-spread of 39 inches and a length of bill of seven inches (dried). Owing to the breaking and loss of my bottle of arsenic I lost the skin of this bird, but I have presented its wings and bill to Mr. John Treadwell Nichols, of the American Museum of Natural History staff, who now has them.—Russell J. Coles, *Danville, Va.*

A Note on the Food of the Passenger Pigeon.—The New York State Museum has recently acquired the dried skins of a pair of Passenger Pigeons taken many years ago, probably in the vicinity of Glens Falls, N. Y. When the skins were relaxed, they were found to contain not only most of the bones and flesh but in the female, the crop full of food. Where the flesh had been removed from the breast and thighs, the skin had been filled with sawdust. The food consisted of twenty-five well preserved seeds of the sugar maple, *Acer saccharum*, Marshall, Close to the base of each fruit, the wing had been sheared off and discarded.—S. C. Bishop, *State Museum, Albany, N. Y.*

Habits of the Osprey.—I am indebted to Mrs. Harry E. Holmes of Malden for information of a rather notable Osprey's nest near her summer home at South Thomaston, Me. The nest is located in a quarry and is placed seemingly precariously on top of a very tall pole of a derrick. It has been occupied for a long time by the Ospreys. The huge structure is in some way interwoven with the wire guys of the derrick which, together with the small top of the pole, seem to furnish at best but an indifferent support. The quarry lay idle for several years but work began there again last summer. Nothing deterred by the noise the Ospreys nested as usual, and Mrs. Holmes saw as late as Labor Day two young in the nest.

Audubon says in his 'Ornithological Biography' that he was never able to corroborate the oft-told tale of the Osprey catching a fish too large to be lifted from the water, with the result that the too-hungry bird, being unable to withdraw its claws, drowned miserably, the fish also perishing. But Nuttall states this to be a fact; and the occurrence is well known. One such case came to my attention two years ago in Quebec. Mr. Felix Davis of *Anse Aux Cousins*, Gaspe, said that while fishing on the north shore of the St. Lawrence River, he and other fishermen noticed an Osprey acting as if about to drop down and seize a large salmon. They saw the

fin of the salmon and knew that it was a fish of some size. One of the fishermen remarked that the "hawk" would hardly tackle so big a fish. But the bird did drop down and strike the salmon. It fastened its claws into the fish which dragged the bird along at speed, say 50 yards. For this distance the Osprey was more or less submerged although a good deal out of water. But then the salmon dived, for the Osprey disappeared entirely and was seen no more. Two or three days later Mr. Davis found the dead salmon with the drowned Osprey still attached to it by its claws which were sticking deeply in the fish's back.—J. A. FARLEY, *52 Cedar St., Malden, Mass.*

Richardson's Owl in Vermont in Summer.—On a recent trip to the Northern Green Mountains, the writers discovered a Richardson's Owl near the summit of Gen. Stark Mountain (3585 ft.) between the towns of Lincoln and Warren, Vt.

We had just broken camp early in the morning of July 18, 1923, on the fourth day of hiking northward on the Monroe Skyline section of the Long Trail, and proceeded to within half a mile of the summit of Gen. Stark Mountain, when we flushed an Owl among the spruces, perhaps a hundred feet from the trail.

We pursued the bird at once, and after cautious manoeuvering obtained very close views in good light,—one of us at a distance of about fifteen feet and the other at thirty feet. Not having a gun, we were unable to collect the bird, but we made a careful description on the spot which proves that it was *Cryptoglaux funerea richardsoni*. It had no ear tufts, and possessed the various other characteristics of *Cryptoglaux;* whereas the clearly yellowish bill pointed to Richardson's Owl rather than the Saw-whet, although the latter was to be expected as the more common. To one of us the saliently noticeable feature of the bird was the strikingly marked facial mask, which was sharply defined by black arcs over the eyes, a diagram of which was made on the spot. Not having seen the bird before, we did not observe distinctly the markings on the forehead which are said to distinguish it from *C. acadica*.

It watched us with great interest and excitement, puffing out its feathers and craning its neck, and with a very fierce look in its eye.

The general color was gray-brown, while the back of its head showed twin streaks of buff or white, one running down the neck on either side, and its back was uniformly gray-brown spotted with white.

The yellow bill brings up a point which raises an interesting question. All skins examined show that the bill of the Richardson's Owl is yellow and that of the Saw-whet is black; but this fact is not mentioned in much of the literature on the subject, nor is the distinct black mark given as a fieldmark. Chapman's 'Handbook' makes no reference to bills, but his 'Color Key' describes the Richardson's as yellow and the Saw-whet's as black. Minot's 'Landbirds and Game Birds of New England' makes the same distinction, as do Stearns and Coues; but in other works, such as

Baird, Brewer and Ridgway, Eaton's 'Birds of New York' and Knight's 'Birds of Maine,' there is no mention whatever of the bill. Barrows in 'Michigan Bird-Life,' describes the bill of *richardsoni* as white. During the last winter, when this Owl was so common in New England, this field mark was called to the attention of the Nuttall Club, and it certainly is evident in the field. So far as we know, there are few records of the Richardson's Owl in New England except in the winter months. Audubon took a specimen near Bangor in September, and the bird is supposed to breed in the vicinity of Montreal.—WARREN F. EATON, *Weston, Mass.*, and HASKELL B. CURRY, *Boston, Mass.*

Food Habits of Owls.—I find some old notes on Owls which indicate quite plainly the after-dark rapacity of these creatures—small as well as big—and the size of the prey which they are capable of killing.

The late Mr. Arthur Johnson of Malden who shot during one season (about 1914) at a goose-stand near Hyannis, this state, told me that they found one morning in December one of their decoy Geese dead on the beach where he had been tethered over night, "with a hole eaten in his back." They let the dead bird lie, and in the dusk of the evening waited "in the battery" for the marauder (which they supposed to be an animal of some sort) to return to his "kill." When daylight was almost gone, so that they could scarcely see beyond a few feet, they discerned something "apparently fluttering" where the body of the Goose could be seen dimly in the gathering darkness out on the beach. They shot in the direction of the moving thing, without in the least knowing what it was—and to their surprise, picked up a huge Horned Owl. The bird was strongly impregnated with the odor of a skunk.

The other Owl story has to do with what might be termed the "antipodes" of *Bubo*—the little Saw-whet. Mr. E. Cutting of Lyme, New Hampshire, once told me that in the fall a few years ago he found that something was killing his Pigeons. He thought it might be a mink or a weasel or some other animal. He had 25 Pigeons that roosted nightly on sticks put up for perches in his barn. The dove-hole was close by in the barn door. Seven Pigeons lay dead one morning on the hay beneath their perches. The birds' heads were gone, some feathers were lying about and there was some blood on their bodies; otherwise there was no sign. The following evening Mr. Cutting went by stealth into his barn. By the light of his lantern he found two more headless Pigeons on the hay. Looking up he saw the "killer" perched on a beam. He despatched it with a long stick. It was a Saw-whet Owl.—J. A. FARLEY, *52 Cedar St., Malden, Mass.*

Lewis's Woodpecker Visits Chicago.—On May 24, 1923, Mrs. T. E. Telfer, 1514 Estes Avenue, Roger's Park, Chicago, reported to the Field Museum that a strange-looking Woodpecker had been called to her attention by Mr. Earl E. Adcock, who resides two houses west of her.

On the afternoon of May 26, I visited the home of Mrs Telfer, who informed me that the bird had been seen by her at 9 o'clock that morning and also at 2:30 that afternoon. We then went to the garden and had not long to wait until the rare visitor made its appearance. It perched on the top of a large bird-house in the center of Mr. Adcock's garden. I had an exceptionally good view of the bird, because the bird-house stood by itself and because Mrs. Telfer kindly loaned me her field glasses. I noticed that the Woodpecker seemed quite contented among the many other species of birds making their homes there, such as Robins, Red-headed Woodpeckers, Orioles and Bronzed Blackbirds. There were many, very fine, large shade trees, which furnished ideal nesting sites for the just-mentioned birds.

This bird, *Asyndesmus lewisi*, strayed a considerable distance from its recorded range, as it nests from western Nebraska and the Black Hills in South Dakota to the inner coast ranges of California, and is casual in western Kansas.—Ashley Hine, *Field Mus. Nat. Hist., Chicago, Illinois.*

Pileated Woodpecker in Washington County, N. Y.—Cossayuna Lake is located in about the center of Washington County, N. Y., and has an elevation of 495 feet. On July 23, 1922, Prof. Barnard S. Bronson, of the State College for Teachers, Albany, N. Y., who was with me for a few days studying the birds, called my attention to a Northern Pileated Woodpecker (*Phloeotomus pileatus abieticola*) on a tree near the shore of the lake. I saw this bird several times during the next two weeks. During July of this year Fred F. Houghton of New York and I saw three of these Woodpeckers at one time on a dead tree in the same locality. In a woods about half a mile away, and probably 100 feet higher elevation, I saw one of these Woodpeckers drilling a large hole in a dead tree. One or two of these birds were seen every day for a period of two weeks. Last year in July a pair of Wood Ducks with nine young were seen at this lake, and this year a female with seven young and also four adults were seen. As E. E. Caduc of Boston reports seeing two Pileated Woodpeckers at Grafton, Rensselaer County, N. Y., elevation 1,500 feet, it would appear that these Woodpeckers are quite generally distributed throughout the central eastern part of New York State.—Clarence Houghton, *533 Washington Avenue, Albany, N. Y.*

Chimney Swift Nesting in a Cistern —On July 4, 1923 I found a Chimney Swift's nest in an abandoned cistern about one mile east of the town of Magnolia, Putnam County, Ill. At the time of its discovery a bird was sitting on the nest while its mate flying out on expeditions and returning every few minutes to the cistern. The sitting bird preened itself and revealed at least one young, about two days old. It looked up at me but did not leave the nest. The mate attempted to fly out past my face twice but returned to cling to the cistern wall each time. It twittered occasionally but showed no great fright.

An abandoned nest occupied another part of the cistern wall.

The cistern was half hidden by vegetation. The diameter at the aperture was three feet and at the bottom nine feet. There was water nine feet below the aperture. The nest was in an entirely sheltered position four feet above the water. All these figures being approximate. The only evident danger was of the young falling into the water.—A. SYDNEY HYDE, *606 Pennsylvania Ave., Urbana, Ill.*

The Colorado Crow.—I recently received through the kindness of Dr. A. F. Hutchinson of Durango, Colo., a Crow skin which he secured in the neighborhood of his home. It has proved of especial value in that it is the second example of *Corvus brachyrhynchos hesperis* coming to my notice that has been collected on the western slope of Colorado. This skin establishes beyond question the fact that *hesperis* occurs on the western side of the Colorado Rockies; it now remains to determine whether or not any of the Crows of this part of Colorado are of the subspecies *brachyrhynchos*. Particular attention should be paid to collecting Crows from the northwestern part of the State into which area *brachyrhynchos* is most likely to wander from Wyoming.—W. H. BERGTOLD, *Denver, Colo.*

Further Notes on the Starling (Sturnus vulgaris) in Canada.—Referring to my previous notes in the July and October issues of 'The Auk' for 1923, it appears I have inadvertently overlooked what purports to be the first record of the Starling in Canada. I refer to the bird obtained by Mr. F. W. Salzman at Betchewun, Province of Quebec (Canadian Labrador), which Mr. Harrison F. Lewis records in his 'Notes on Some Labrador Birds,' 'Auk,' Vol. XXXIX, 1922, No. 4, p. 513. Betchewun, a tiny hamlet with a permanent population of only three persons!, is situated eighteen miles east of Esquimaux Point, on the southern coast of the Labrador Peninsula, and is approximately 840 miles from New York. The bird in question was taken in April 1917, and thus antedates Mrs. R. W. Leonard's Ontario record by over two years. So far as I know, Aroostook County in Maine, (some 400 miles north of New York), is the most northerly point recorded for the Starling in New England, so this lone bird made quite a jump when it landed in Labrador, another four hundred miles or so farther north. Probably it was not a lone bird, and the jump may not have been so very extraordinary, as the intervening country between Aroostook and Betchewun may have seen many hundreds of Starlings for what we know. To the average man in the street any dark plumaged bird would be put down as a Blackbird, and it will no doubt be years before we can get any adequate idea of the distribution of the Starling in Canada. As already mentioned the Starling breeds in northern Europe, and there is no reason why it should not do so in Labrador. The pair that bred here this summer are still with us (Nov. 12), notwithstanding the fact that the thermometer on many occasions has registered 18° and more of frost. Every night just as the sun goes down, they go to roost, either in the old nesting site in the ball on the top of the church spire, or else in a large

white pine tree close at hand. In the morning they are usually to be found round about the spot, from seven to eight o'clock, after which they are not seen again for the rest of the day, until the evening. Sometimes, the pair are joined by a third bird, and on October 27, fifteen were flying round the spire at 8:30 A. M., whilst the above-mentioned three were perched on the top. This flock, failing to find accommodation on the spire, flew off south, and have not been seen since. In addition to this flock, I saw another one of some twenty birds near Compton, a village seven miles to the east of Hatley on August 8. This with my previous notes will give some idea, although probably an inadequate one (from lack of sufficient qualified observers), of the status of the Starling in these parts at the present moment.—Henry Mousley, *Hatley, Que.*

Evening Grosbeak (Hesperiphona vespertina vespertina) in Michigan.—Last December I sent in some notes, which were published in the April 1923 number of 'The Auk,' in which I stated Dr. Christofferson and myself had found Evening Grosbeaks in summer for three consecutive years. We have found them again this summer which makes the fourth consecutive year. Last winter, as since the winter of 1915–16, I had a flock feeding at my house. The flock was larger than usual, numbering over 100. I banded 58. The first of the flock arrived November 16 and the last one, a female, left May 23. Since then we have seen the following:

June 16—1 Male near Soo Junction, Luce Co.
July 22—1 Male, Chatham, Alger Co.
July 24—2 Males, Munising Junction, Alger Co.
July 29—1 Male and 1 Female feeding at house.
Aug. 8—1 Female feeding at house.
Aug. 12—1 Male about 15 miles west of Soo.
Aug. 19—10, 4 of them young, Munising, Alger Co.
Aug. 27—1 young feeding at house.
Sept. 3—1 young feeding at house.
Sept. 4—3 Males and 1 Female feeding at house, trapped and banded 1 Male.
Sept. 5—2 Females and 2 young feeding at house.
Sept. 8—3 Males, 3 females and 2 young feeding at house.
Sept. 9— Small flock 10 or 12 birds at house, 1 young feeding.—M. J. Magee, *Sault Ste. Marie, Mich.*

Blue Grosbeak at Cape May, N. J. —On November 11, 1923 while looking for birds at Cape May Point, N. J., I heard a loud metalic call which I soon found came from a bird in a nearby thicket which I had no trouble in identifying as a female Blue Grosbeak (*Guiraca caerulea caerulea*). I approached to within fifteen feet of it and studied it for fifteen or twenty minutes as it showed no disposition to fly away. The large heavy bill, reddish brown of the wings and all the details of brown markings on the plumage were clearly made out. Previous acquaintance with the western race in Arizona precluded any possibility of mistake and skins of the bird

were examined the next day which agreed in the minutest detail with my observations.

The date is, of course, remarkable but curiously enough the only recent record accepted by Griscom in his 'Birds of the New York Region.' for Long Island is October 15.—JULIAN K. POTTER, *Camden, N. J.*

The Lark Sparrow (Chondestes g. grammacus) in New Brunswick.—On August 13, 1923 I recognized a Lark Sparrow feeding in the road at North Head, Grand Manan Island, N. B. The distribution of white in the tail and the face markings were unmistakable. Procuring my collector, I returned to the spot and secured the bird which proved to be an immature male. I have given the specimen to the Victoria Memorial Museum at Ottawa. On August 16, about half a mile further along the road, I discovered two more of the same species and watched them at close range.

This is my fourth experience with this Middle West bird on the eastern coast, and confirms me in the belief expressed in 'The Auk', XXIII, 1906, p. 103; "that stragglers in the migration along our eastern coast may not be so very rare, but that they are overlooked, being mistaken for Vesper Sparrows, owing to the white outer tail-feathers."—CHARLES W. TOWNSEND, *98 Pinckney St., Boston, Mass.*

Abnormal Cedar Waxwing.—I saw in April, 1920, at St. Johnsbury, Vt., in a small collection of mounted birds owned by C. H. Horton, Esq., a Cedar Waxwing (*Bombycilla cedrorum*) with *yellow* tips to its wing-quills instead of the usual red sealing-wax adornments. This is most unusual. The only similar case that I know of is mentioned by George A. Boardman of Calais, Me., in his letter of June 14, 1875, to Prof. Spencer F. Baird in which he says that he "shot a Cedar Bird with the waxen tips bright yellow instead of red."—J. A. FARLEY, *52 Cedar St., Malden, Massachusetts.*

Palm Warbler Summering in Northern Wisconsin.—On June 24, 1923, while searching an open, moss-covered bog in the northern part of Rusk County, Wisconsin, I discovered a singing Palm Warbler (*Dendroica palmarum palmarum*) in a group of very small, scattered tamarack saplings.

I returned to the same bog on July 1, this time locating two Palm Warblers, one of which was studied closely through glasses and even sketched, as it sang from a point less than ten feet distant. On July 8, also, two Palm Warblers were found in the same vicinity, one of the two having food in its bill at this time. I made three special trips to this bog to verify the identification and to study the birds. The characteristic wagging of the tail and the markings were observed carefully, as was also the song.

The song was a short, pleasant, wavy trill—a repetition of a very few notes—combining certain elements to be found in the songs of the Chipping Sparrow and the Slate-colored Junco, yet with an added quality peculiar to itself. Though not spectacular it could be heard for a long distance

over the hot, moist bog and could not fa il to attract the attention of any bird-lover. It was given from a height of from six to twelve feet, the bird usually perched on the top of a sapling or dead spruce, and with the head thrown far back.—WALLACE B. GRANGE, *Ladysmith, Wisconsin.*

The Cerulean Warbler in Dutchess County, N. Y.—On May 14, 1922, two Cerulean Warblers (*Dendroica cerulea*) were seen along Wappingers Creek, about three miles from Poughkeepsie. (Prof. Charles W. Moulton, Allen Frost, George W. Gray.) This very pleasant surprise was followed by a breeding record which was probably the first for Dutchess County. Several other Ceruleans were also noted that season. ('Auk,' Vol. XL, 1923, p. 104.) During 1923 six males have been located within a radius of three miles, southeast of Poughkeepsie and at least two of these found mates and nested. Careful search revealed none until May 7, when I was reasonably sure of two singing males, one of which was seen. The nests of these were found later in exactly the same locality as the 1922 birds. On May 9 another singing male was found a mile southwest and seen with a female on May 27. On May 20 the fourth male was found about three miles southeast of the first bird (Raymond Guernsey, Frost, Gray), and on a later date was verified by Maunsell S. Crosby. On May 30 a fifth male was found a mile south of the original location and June third, a sixth was found singing a half-mile northeast. On May 11, a female was seen on Cedar Ridge about 500 feet from where the sixth male was later seen,—possibly its mate.

On May 20, the nest of the first pair was found (Guernsey, Frost, Gray) and contained one egg on May 24. This nest was not examined again. On the same day a nest of the second pair was also found. Something had gone wrong and the female was using bits of this nest in building a new one. On this occasion, the new nest was not definitely located, but the next day was found nearly completed. A Kingbird was then removing and using what was left of the old nest and the Cerulean was gathering caterpillar webs and made no more visits to the old nest while observed. Complete data on the first nest would undoubtedly have given a rather early nesting record.

These Warblers were heard regularly from May 7, to June 23, and then apparently came a lull. On August 2, a male of the first pair (?) was singing and feeding in the tops of the trees, confining himself entirely to elms, although there was a good percentage of bass-woods, ash, and buttonwoods, as well as a few beeches inviting his inspection.

Of the five nests found in 1922–1923, three were in buttonwoods, one in a sugar maple and one in a white oak. All were well up; the lowest 25 feet and the highest fifty feet or more. Two were rather like a Pewee's nest in appearance though all that could be examined were fairly deeply cupped. The three others were very like a Redstart's and all were well decorated with some whitish substance which was probably the white inner bark of rotting basswoods, as a female was seen gathering this material May 23, 1922.

Three of the six 1923 males were located along the Wappingers another by the Casparkill and two were in woods with swampy ground or ponds very near. The presence of water is probably more than a coincidence and seems to indicate a preference for such conditions. The Cerulean Warblers were last noted August 22, 1923.

The following records for 1923 north of Poughkeepsie have been supplied by Maunsell S. Crosby, all being males and noted in moist woods near water. Hyde Park May 12 (2); 13 (2); 19 (3); 20 (2). Not visited after this date. Camp Meeting Woods, Rhinebeck, one bird May 18, 29, 30, June 2, 17, This bird is interesting in that it may be the same individual as one observed in that place in June, 1922, for, instead of having the usual song, a buzzy slightly rolled "cheer,-cheer,-cheer,-cheer,-cheer,-cheer,-cheeee" suggesting one of the songs of the Golden-wing, it gave a peculiar Veery-like ending, "cheer,-cheer,-cheer,-cheer,-cheer,-cheer,-churrr,-churrr-churrr," though it occasionally used the other shorter song. No other Cerulean Warbler heard here has had such a song. Leacote, Rhinebeck, one bird May 22, 28, June 14. On June 25 a Cerulean crossed Crosby's lawn in a leisurely way from east to west, singing as it went though its nearest regular station at Camp Meeting Woods was a mile and a half away. Another Cerulean was heard singing in the Charles Woods, Barrytown, on June 27, where it had never been found before.

To summarize: six males and at least three females have been noted in 1923 in the original Wappingers region southeast of Poughkeepsie, and seven more males north of Poughkeepsie, a total of 13 males. They were still in every locality in which they were found in 1922. On the whole the species seems to have made an encouraging increase and it is to be hoped that it is really established. It would be interesting if observers in other parts of the Hudson Valley would make diligent search for it.—George W. Gray, *Poughkeepsie, N. Y.*

Redstart (Setophaga ruticilla) Breeding in Alabama.—I am in possession of a communication from Mr. Lewis S. Golsan, of Booth, Alabama, that constitutes the first authentic record, so far as I am able to ascertain, of the nesting of the Redstart within the boundaries of Alabama. Though the bird has been repeatedly observed in the State during the breeding season, the nearest approach to a definite nesting record is Avery's unqualified statement ('American Field,' Vol. XXXV, p. 55, Jan. 17, 1891) that it "Breeds" near Greensboro. Therefore I deemed the matter of sufficient interest to make a special visit to Mr. Golsan and inspect for myself the nesting site.

The nest, apparently completed, was discovered by Mr. Golsan on May 6, 1923, in Bridge Creek Swamp, about two and one-quarter miles southeast of Booth in Autauga County. It was placed about twenty feet above the ground in the small fork of a red maple limb and only a few yards from the public roadway through the swamp. Visiting the place again on May 12, Mr. Golsan found the female Redstart sitting on the nest, which she

seemed reluctant to leave until he had touched the tree. Two fresh eggs were collected. The nest is a compact cup-like structure of shredded inner bark and other plant fibers, lined with very fine grass and hair.—Ernest G. Holt, *312 Bell Building, Montgomery, Ala.*

Note on the Labrador and Acadian Chickadees.—The Acadian Chickadee (*Penthestes hudsonicus littoralis*) in juvenal plumage resembles very closely, in the darkness of its plumage and in the absence of rich browns, the Labrador Chickadee, *P. h. nigricans*. Unless this fact is borne in mind there is danger of juvenal Acadian Chickadees in June and July in New Brunswick and Nova Scotia being mistaken for Labrador Chickadees and so reported. The dark juvenal plumage of the Acadian Chickadee is changed according to Dwight, ('Plumages and Moults of Passerine Birds of New York,' 1900,) by a post-juvenal moult in August into the first winter plumage when "young and old become practically indistinguishable." After the change into the first winter plumage, the Acadian Chickadee in its rich browns is easily distinguished from the much grayer Labrador Chickadee.—Charles W. Townsend, *98 Pinckney St., Boston.*

Late Nesting of the Hermit Thrush.—The following notes relative to the nesting of the Hermit Thrush (*Hylocichla guttata pallasi*) may be of some interest to readers of 'The Auk'. On August 15, 1922, while photographing orchids on Berlin Mountain, situated on the Massachusetts -New York state boundary, I found at the edge of the spruce growths, at an elevation of about 2500 feet, a nest and three eggs of the Hermit Thrush. Madam revealed its location by fluttering forth from her brooding as I passed within a few feet of her. The eggs appeared to be well advanced in incubation, and a subsequent visit indicated that the young birds matured and got safely away. I secured an interesting photograph of the nest and its contents. Breeding Hermit Thrushes are not uncommon on the higher elevations of the Berkshire Hills, occurring more frequently probably where the spruce woods abound. But that which chiefly interested me in this instance was the lateness of the nesting date. Would this late date seem to indicate a delayed nesting, or rather a second brood? Again during the season just past, on July 28, while among the hills of southern Vermont I discovered in a somewhat similar manner another nest of the Hermit, this one containing four eggs well advanced in incubation. A later visit, on August 12, showed the nestlings developing in a rapid manner. Are these late dates indicative of dilatory family raising on the part of the Hermit Thrushes, or of strenuous efforts with second broods?—S. Waldo Bailey, *Williamstown, Mass.*

Notes from Massachusetts and Maine.

Uria troille troille. Murre.—It has been this museum's good fortune to have acquired recently from Dr. Stanley Cobb of Milton, Mass., a personally collected Murre from Penikese Island, taken on the astonishingly late date of June 26, 1913. It is not sexed. This bird is in full breeding

plumage, and is, as far as I have noted, the fourth trustworthy record for this state, and the only specimen taken hereabouts in this plumage.

The other records are a male taken May 18, 1921, at Essex, Mass., by Mr. A. B. Fuller ('Auk,' July, 1922); an unsexed specimen picked up at Brant Rock, Mass., March 29, 1922, and added to our collection through the kindness of Mr. E. H. Forbush, and a male taken at Westport, Mass., on April 7, 1923, by Mr. S. O. Dexter. This also is in the Society's collection.

Sterna hirundo. COMMON TERN.—On a recent excursion to Tuckernuck Island from October 26 to November 2, 1923, I saw an exceptionally large number of Terns for this late period. Of some dozens seen, all that I could identify proved to be Common Terns, and about one third were immature.

Coragyps urubu. BLACK VULTURE.—Through the kindness of Mr. William C. Adams, Director of the Massachusetts Fish and Game Commission, the Society has acquired a female Black Vulture, taken at Chatham, March 31, 1923.

Icterus galbula. BALTIMORE ORIOLE.—There is a male of this species from the collection of the late Mr. William Brewster, taken at Ayer Junction, Mass., on November 23, 1893.

Pinicola enucleator leucura. PINE GROSBEAK.—From the above collection there is a male Pine Grosbeak taken in Cambridge, Mass., on May 9, 1893.

Hirundo erythrogastra. BARN SWALLOW.—On the South Pond, Tuckernuck Island, from October 26–31 I saw each day three Barn Swallows. On November 1 there were four.

Rowing out in a skiff I not only satisfied myself as to the identity of these birds, but also noted upon the rank growth of water weeds, that reached the surface, myriads of some kind of dipterous insect, for which these belated Swallows were constantly dipping.

Lanivireo solitarius solitarius. BLUE-HEADED VIREO.—Mr. J. D. Smith, the Society's preparator, secured a male Blue-headed Vireo at Randolph on November 10, 1922.

Thryothorus ludovicianus ludovicianus. CAROLINA WREN.—The above collector shot a male of this species on August 8, 1923, at Dark Harbor, Maine.

Polioptila caerulea caerulea. BLUE-GRAY GNATCATCHER.—A male of this species was taken by Mr. Smith at Quincy, Mass., on June 2, 1923. —W. SPRAGUE BROOKS, *Boston Soc. Nat. Hist., 234 Berkeley St., Boston.*

Recent Records from Elizabeth, N. J.—The following 1923 records from the salt marsh lying between Elizabeth and Newark, N. J., seem worthy of record:

Larus marinus. GREAT BLACK-BACKED GULL.—A single bird, my first local record, over Newark Bay near Elizabeth, March 5, 1923.

Larus philadelphia. BONAPARTE'S GULL.—This species evidently wintered through the 1922–1923 season on Newark Bay. Dates after January follow: January 20—50; January 27—40; February 17—35; February 18—3; March 3—18; April 21—10.

Casmerodius egretta. AMERICAN EGRET.—One on August 23 and one August 30 (T. D. Carter and the writer). Third consecutive year on the local marsh.

Florida caerulea. LITTLE BLUE HERON.—A single bird on the salt marsh, July 21. Fourth consecutive year in this region.

Lobipes lobatus. NORTHERN PHALAROPE.—A single bird in changing plumage on a salt marsh pond August 10. Very tame. When closely approached would fly only a short distance uttering a loud "quit, quit, quit."

Pisobia bairdi. BAIRD'S SANDPIPER.—A bird I identified as of this species appeared on the local marsh August 23, 1923 with several Semipalmated and a single Pectoral Sandpiper. In comparison with the latter the bill was shorter, size smaller, top of head lighter and less sharply contrasted with the sides of head and neck; also breast much less streaked and without the sharply defined demarkation between streaked and unstreaked underparts characteristic of the Pectoral. In flight the absence of white on the wings was positively determined. A few days later two adult Baird's Sandpipers were pointed out to me at Jones Beach, L. I., by Mr. Ludlow Griscom of the American Museum of Natural History who informs me that this species was unusually numerous on Long Island during August. Judging from this comparison the local bird was apparently an individual in immature plumage.

Ereunetes mauri. WESTERN SEMIPALMATED SANDPIPER.—I have looked for this species for years among the thousands of Semipalmated Sandpipers that pause annually on the local flats, but without success until September 6 when I observed in a mixed flock of Least and Semipalmated Sandpipers a single bird which showed a slightly browner back than the latter and a noticeably longer bill. Among the Semipalmated I could see the difference in length of bill between the sexes, but this bird had a distinctly longer bill. I flushed the flock several times and was always able to pick the long-billed individual out of the flock after they alighted. The previous week, on Long Island, I had seen specimens of all three species of these small Sandpipers shot, and had opportunity to study their differences closely. While I feel certain of the identification, and while there is no good reason to doubt the occasional occurrence of this species here, its identification in life is so critical that it is better to regard this observation as evidence of probable occurrence rather than a positive record.

Numenius hudsonicus. HUDSONIAN CURLEW.—A single bird, my first definite local record, August 23, 1923.

Pluvialis dominicus. GOLDEN PLOVER.—A single bird I heard calling at dusk on August 23, the plaintive call that Forbush well describes as

"too-lee-e," not so loud and I believe somewhat higher pitched than the whistled "toor-a-wee" of the Black-bellied Plover. A second bird, one of a pair, was taken by a local hunter on August 30, and examined by Mr. T. D. Carter of the American Museum of Natural History and the writer. We took a leg and foot to substantiate the record. A third bird I found on a burnt spot on the local marsh on September 3. The absence of conspicuous white on the tail and absence of black axillars, together with the characteristic calls, confirmed the identification. The bird called four distinct calls as it flew about, sometimes coming close in response to my attempted imitations. There was (1) the queedle, (2) a softer series of staccato notes, which may be equivalent to the call Dr. Townsend describes as a "chuckle," (3) a plaintive whistle on a rising scale without punctuation and (4) a punctuated whistle of the same quality, the usual "too-lee-e". This species has apparently a much wider range of notes than has the Black-bellied Plover. Old hunters who I believe are competent to identify the species tell me that several Golden Plovers have been killed on the local marsh this season. The present status of the species here I would describe as "increasingly rare but still a regular late summer and early fall migrant."

On the uplands about Elizabeth I have the following records:

Cathartes aura septentrionalis. TURKEY VULTURE.—Three seen May 11, 1923—my first local record for over twenty-five years.

Thryothorus l. ludovicianus. CAROLINA WREN.—A singing bird on July 29, 1923—my first local record since the winter of 1917–1918.

Cistothorus stellaris. SHORT-BILLED MARSH WREN.—A singing bird on June 17 near Elizabeth—my first local record.—CHARLES A. URNER, *Elizabeth, N. J.*

Some 1923 Records for Northern New Jersey.—In a cut-over pine swamp two miles southeast of Morris Lake, Sussex County, N. J., and at an altitude of about 1,300 feet, I found on July 1, a Pileated Woodpecker (*Phloeotomus pileatus abieticola*). This locality is just seven miles south of west from Newfoundland, Passaic County where the bird has been found in recent years. The record extends the known present range of the species to that extent.

The Parula Warbler (*Compsothlypis americana usneae*) I heard singing on both sides of the Delaware River at Dingman's Ferry, Pa., and also on the New Jersey side of the river a short distance south of Delaware Water Gap on June 27. These two records, the former from Sussex and the latter from Warren County, extend the known summer range of the species southward along the Delaware River.

The Black-throated Green Warbler (*Dendroica virens*) was singing in some numbers on July 1 in the hemlocks at the south end of Longwood Valley, about four miles northwest of Dover, Morris County, N. J. This locality is as far south, in fact probably a little farther south, than either Demarest or Alpine, N. J., two points on the eastern border of the state where the species has been reported breeding.

A single Hermit Thrush (*Hylocichla guttata pallasi*) on the morning of July 22, was seen along the brook flowing south from Split-rock Pond, Morris County, (altitude 820 feet) toward Meriden, about five miles northwest of Boonton. This extends the summer range of the species southward from localities in which it has formerly been found though whether it occurred in this locality as a breeder or transient is uncertain.—CHARLES A. URNER, *Elizabeth, N. J.*

Records from North Beach, Barnegat Bay, N. J.—Running south from Bay Head, N. J., for twenty-five miles and separating Barnegat Bay from the Atlantic is a narrow strip of sand dunes and beach which offers attractive possibilities for the present-day ornithologist. Along the first fifteen miles of this strip at intervals are more or less well developed summer resorts, but the last ten miles, from Seaside Park to Barnegat Inlet, a stretch known formerly as Island Beach and today locally as North Beach, is most of the year uninhabited except for the crews of three coast guard stations and a few hunters and fishermen whose shacks are reached by boat or by following the beach.

From June to October, 1923, the writer made monthly trips over this sandy strip, starting at Seaside Park and following the ocean beach south to the Inlet, returning part of the way along the Bay shore. Two trips were made alone, one with R. H. Howland and Rudyerd Boulton and two with T. D. Carter of the American Museum of Natural History.

The location is well suited for the observation of ocean and bay bird life and at the southern end great sand flats, extending far out into the Bay at low tide, furnish an attractive resting or feeding ground for shore birds, Gulls and Terns. There are also a number of adjacent sedge-covered islands in the Bay which can be reached from the beach by boat.

The strip itself is partly covered with low growths such as bayberry, entwined with poison ivy and cat-brier. As to trees there are a few clumps of low cedars and scattering dwarf oaks and hollies. In spite of the poor sandy nature of the soil the place supports, judging from signs and tracks, a considerable number of mammals, chiefly rabbits, opossums and the smaller rodents, with a few muskrats along the Bay shore. At the southern end opossum tracks are found all about, from the oceanb each far out onto the Bay flats.

Among the many interesting bird records five trips over this region have yielded, the following seem worthy of note:

Gavia stellata. RED-THROATED LOON.—An adult with red throat seen June 20, 1923. This species has rarely been recorded from New Jersey and never before reported in the state as late as the above date though one was reported from Grassy Sound, N. J., June 15, 1904. (Stone 'Birds of New Jersey'.)

Stercorarius parasiticus. PARASITIC JAEGER.—A single bird October 28, 1923 chasing Laughing Gulls just outside the surf. (T. D. Carter and the writer.)

Sterna caspia. CASPIAN TERN.—Four seen by the writer on the flats at the Inlet August 12, 1923 and a single seen by Carter and the writer in same locality September 16. The four birds were with Gulls, Shorebirds and other Terns. Relative size carefully noted at close range; heavy red bill well seen; also short-notched tail beyond which the primaries extended some distance when the birds were at rest. Harsh call notes heard. Only one previous definite record for the species from the state is reported in Stone's 'Birds of New Jersey' (a bird taken by G. N. Lawrence in 1850). However there are several records from points not far from the Jersey border.

Sterna antillarum. LEAST TERN.—A single bird July 29, 1923. (Howland, Boulton and the writer).

Sula bassana. GANNET.—A single bird in changing plumage September 16, 1923. (Carter and the writer). I can find no previous published September record for the state.

Rallus crepitans. CLAPPER RAIL.—Two nests, one containing 8 and one 12 eggs found July 29 (Boulton, Howland and the writer) are rather late.

Ereunetes pusillus. SEMIPALMATED SANDPIPER.—A single bird October 28 (Carter and the writer) is abnormally late.

Pisobia minutilla. LEAST SANDPIPER.—A single bird with the above October 28 (Carter and the writer). This bird was slightly lame but apparently healthy and normal on the wing. It is a later record for the species than I have found for New Jersey.

Vermivora ruficapilla ruficapilla. NASHVILLE WARBLER.—One found near the Bay outlet October 28 (Carter). Griscom mentions only one later record for the New York City region—Nov. 16, 1907 at Englewood, N. J.

Geothlypis t. trichas. MARYLAND YELLOW-THROAT.—A single bird October 28 (Carter and the writer) seems unusually late.

Regarding the fall flight of ducks on the bay, Black Ducks were unusually abundant early in the season. Flocks of Brant were seen going south October 28, and the species was rather common on the bay during November. On November 13 Greater Scaups and Red-breasted Mergansers made up the great bulk of the flocks though there were a few flocks of Redheads. Several Canvasbacks were taken November 9. Buffleheads seem to show some increase. Several small flocks were seen November 13 and of 28 ducks killed from one point on that day three were of this species.—CHARLES A. URNER, *Elizabeth, N. J.*

Notes on Michigan Birds.

Quiscalus quiscula aenus. BRONZED GRACKLE.—In his 'Michigan Bird Life' Barrows states that, "We have never seen a nest less than eight feet from the ground" and then speaking of nests found low down in reeds in Minnesota and Iowa he adds "but we have been unable to find any record of such a habit" in Michigan. In view of these statements it may be worth while to record a nest of this species found June 9,

1923 in a small marsh four miles southeast of Ann Arbor. The nest of grass and mud was lodged in a clump of bulrushes about a foot above the water. Both parents hovered and scolded over head while the four half-grown young were being banded.

Dendroica coronata. MYRTLE WARBLER.—June 20, 1919 a nest was found near Hessel, Mackinac County, Michigan which contained a Cowbird egg and a Warbler egg. Two Warbler eggs were added on subsequent days but the nest was finally deserted. June 23, 1919 near the same place a female Cowbird was frightened from the edge of a Myrtle Warbler nest containing five eggs about to hatch. Neither Bendire nor Chapman include this bird in their lists of Warblers victimized by the Cowbird.

Childonias nigra surinamensis. BLACK TERN.—N. A. Wood and Tinker wrote in 1910 ('Auk,' XXVII, 129) that this Tern was a migrant but "may possibly breed" in the county. The writer found a nest in a small marsh four miles southeast of Ann Arbor on June 7, 1922. Another nest was found nearby by A. S. Warthin, Jr. The Black Tern is now quite numerous on a number of lakes in the county during the breeding season. —J. VAN TYNE, *Ann Arbor, Michigan.*

Notes from Madison, Wisconsin.

Sialia sialis sialis. BLUEBIRD.—The wintering of this species is sufficiently unusual to be worthy of mention; from one to three individuals were seen in the vicinity of Lake Wingra on various occasions from January 7 to March 10, 1923.

Bubo virginianus virginianus. GREAT HORNED OWL.—An early nesting record for this region was obtained on Feb. 11, in zero weather. The sitting bird on leaving the nest was immediately mobbed by a flock of Crows. After descending from the nest, that contained one egg, I waited 20 minutes at a distance from the tree for the parent to return, but to no purpose. On March 25 the nest was found abandoned. The interval was marked by several blizzards and much subzero weather.

Baeolophus bicolor. TUFTED TITMOUSE.—Supplementing the recent records by Mr. Warner Taylor, the writer took a male at Lake Wingra, Feb. 25.

Loxia curvirostra minor. CROSSBILL.—There was an unusual influx of Crossbills from April 5 to 14. Boys in the neighborhood picked up two birds and fed them; they ate voraciously but died in a short time.

Spinus pinus. PINE SISKIN.—This species was exceptionally abundant during the period just given. On April 14 a flock of 250 Pine Siskins and 22 Crossbills were found feeding industriously on the ground under a clump of conifers just as a heavy snowstorm set in. —A. W. SCHORGER, *Madison, Wisconsin.*

Argentine Birds.—Mrs. W. S. Harrison of Tiverton, Devon, England, who lived for many years in the Argentine Republic, tells me that in 1889 there were a great many birds on the Pampas. At this time people were

still comparatively few in her section. One of the familiar birds was the "Guira Cuckoo," *Guira pirirgua* (Vieill.), a species famed for its tameness and intelligence. There was a pet Guira Cuckoo in the Harrison household. They called the bird "Impudent Barney"—something of a misnomer as it appeared later when the pet turned out to be a hen. When bought in the Buenos Ayres market, this bird was fairly tame and would eat out of one's hand. In the Buenos Ayres vernacular the species is called "Uracca" (Magpie).

"Our 'Uracca' was a striking and beautiful bird," says Mrs. Harrison, "being considerably over a foot in length, with red eyes and orange bill, rufous crown, with loose lengthened crest, dark brown upper parts and white rump and breast. But most conspicuous was the long, parti-colored tail—brown, yellow, black and white—spread out fan-like as the bird flew."

Mrs. Harrison tells me that "Impudent Barney" had a most extraordinary egg-laying propensity. The bird was prodigal with her eggs; seemed, in short, to have an egg-laying gift. She would lay an egg rather frequently and almost anywhere she happened to be—in one's lap, or in a child's cradle or on a lady's shoulder from which it would drop to the ground.

" 'Impudent Barney' was never shut up," says Mrs. Harrison. "He (or rather she) used to fly out to meet us when we were driving home. Generally we would see her flying toward us from a long way off. She met us once when we were still three miles from the house. She would jump on the back of dogs, and would run up and down the table as if desirous of seeing what each one had to eat. You could pick her up at any time. We had other pet birds of the same species, and often they all would wait for food on the roof of a shed. We used to cut up meat and throw it up in the air as high as we could, and they would fly out and catch it on the wing. They never missed."

W. H. Hudson, speaking of the egg of the Guira Cuckoo, says it is "beautiful beyond compare," being of an "exquisite turquoise blue," spattered over with white calcareous spots like snowflakes which were "so extremely delicate that their purity is lost on the egg being taken in hand." Mrs. Harrison corroborates this: "The light blue egg had a white deposit of a beautiful lacy pattern which would rub off if care was not taken."

Another of Mrs. Harrison's pets was the singular Crested Screamer, *Chauna chavaria* (Linn.)—"Chaja" in the Argentine vernacular. This bird, although armed with spurs on its wings, is well-known as a most sociable fowl, although, according to Hudson, it is "often unfriendly toward dogs and cats." But Mrs. Harrison's three young Screamers used to sleep in a box, in a squirming mass with three puppies which were forever trying to snuggle in under the wings of the birds. These for their part would press their wings down hard against their sides so as to avoid the meddlesome intrusion of the little dogs.—J. A. Farley, *52 Cedar St., Malden, Mass.*

Destruction of Birds in South Carolina. Notes which I made at the time of two notable storms which destroyed great quantities of birds seem worthy of publication. One was the great storm of August 27, 1893, and the other the blizzard of February 13 and 14, 1899.

The storm of 1893 blew generally from northeast. Reaching the point where I then was, a hundred miles inland near the Savannah River, which divides Georgia from South Carolina, during the day of August 27, it blew with fury far into the night. Next morning when the wind lay, adjoining fields were white with seabirds. They covered the ground. These birds must have been blown there from the North Carolina and Virginia coasts. They remained in the vicinity for a day or two, then all disappeared. The shore line, from Virginia and Maryland to the tip of Florida was strewn with wreckage and dead birds. As no investigation was made and no report submitted by anybody, so far as I know, actual damage is a matter of surmise, only it was great and deplorable. The toll taken of human life was grevious, and the American Red Cross took charge of the situation about Beaufort, S. C., buried the dead, fed the starving and housed the homeless.

The destruction of birds was mainly confined to seabirds and migrants, the resident land birds suffering little, if at all.

Strangely enough, some species of birds were actually gainers by the storm, for the ruin of rice crops left hundreds of thousands of bushels of rice in the fields on which ducks feasted and fattened. Freshets sometimes render the same service to wild Geese by destroying corn fields and leaving rotten corn for winter fare.

The blizzard began on Saturday, February 13, and continued to snow fast and furious through Sunday and part of Monday. Tuesday morning broke clear. The snow ceased falling and the worst was over.

Then evidences of destruction to wild life could be ascertained. In one field, along a ditch-bank for half a mile, there was a string of dead Doves. Larks were frozen in fields, even Crows were found dead. Myrtle thickets were strewn with dead Sparrows. Flickers and other Woodpeckers were frozen. A family of raccoons was found frozen in a hollow tree, about the last animal one would expect to succumb to cold. Little Ground Doves, Bluebirds, Mockingbirds, Cardinals were found dead all around. In short, it was the most complete destruction of bird life throughout a big region that I have ever known or heard of. For many years no Bluebird or Ground Dove was seen in the State, and only scattered individuals remained of the vast flocks of Mourning Doves. It was my opinion that thirst and hunger had more to do with killing birds than cold.

Next day a freshet came down river as the thaw set in and I took a boat for the port town. On arriving there just before nightfall I saw a negro boy chase a bird across the street. The bird came down and the boy killed it with a stick. On asking what species of bird it was, for it was too dark to make out, the boat captain told me it was a Woodcock.

After supper I visited the town market and saw strings of wheelbarrows loaded with Woodcock, all they could haul. The birds were so weak that they had fallen victims to men and boys with sticks. All were unfit for market and had to be thrown away.

How many of these noble game birds perished in this way and at the hands of gunners, I cannot say; but that the number ran far into the thousands at this one place, there is not room for doubt. Indeed the number offered to that market ran into the thousands. Woodcock came perilously nigh to total extinction.

Wild Turkeys and Partridges suffered little; probably Ducks escaped with minimum loss; but wild life as a whole received a staggering blow.—JAMES HENRY RICE, JR., *Wiggins, S. C.*

RECENT LITERATURE.

Griscom's 'Birds of the New York City Region.'—As is well known Mr. Ludlow Griscom has for some years been studying the possibilities of sight identification with the idea of eliminating so far as possible errors in field observations. He is not alone in this work as its importance is at once recognized by all students of living birds, but he has taken a leading part in it, and results are beginning to show in the mention in our books of field marks by which a bird at some distance may be recognized, in addition to the older type of description based upon specimens which can only be used satisfactorily when the bird is in the hand. Mr. Griscom has also been making an intensive study of the bird life about New York City and the little volume before us[1] combines the results of both of these investigations. It is one of the handbook series of the American Museum of Natural History and is published by that institution in cooperation with the Linnaean Society of New York, taking the place of similar Museum publications on the local avifauna by Dr. F. M. Chapman, published in 1894 and 1906.

Mr. Griscom's method of treatment is admirable. An introductory paragraph presents some general facts concerning each species, often with pertinent points regarding its identification in the field. Then follow several more detailed paragraphs on its occurrence on Long Island, in other portions of New York within the area covered, and in the northern portions of New Jersey. These again are subdivided for several localities where intensive studies have been carried on by the author or some of his collaborators. For Orient, Mastic and Long Beach, Long Island; the Bronx region and Central Park, and sometimes Staten Island, New York;

[1] **Birds of the New York City Region. By Ludlow Griscom, Assistant Curator of Ornithology. With the cooperation of the Linnaean Society of New York. The American Museum of Natural History Handbook Series, No. 9. New York, Published by the Museum. 1923. pp. 1–400, 6 plates, 30 figures and a map. Price $1.00, post paid $1.05.**

and Englewood, New Jersey. Mr. Griscom has omitted from his territory those parts of the fifty-mile circle, usually regarded as bounding the 'New York Region,' from which he had no detailed data, such as Rockland, Putnam and Orange Counties, N. Y., and those parts of New Jersey which lie south of Sandy Hook and the Raritan River, and also western Connecticut which has been so thoroughly covered in a special publication on the birds of that state.

The vast amount of sight records and published information that the author has had to review in preparing such a list as the present can only be appreciated by those who have had similar work to do, and the elimination of the probable errors is a difficult and thankless task. All of this, however, Mr. Griscom has done with admirable judgment and the result is the most satisfactory local treatise that we have seen. In cutting away from many of the traditional requirements of the last generation and considering primarily the needs of the host of present day field students it sets a standard and example for what, as we have said elsewhere, might be termed the "new ornithology."

The nomenclature wisely follows that of the A. O. U. 'Check-List' although there is some inconsistency in the duplicating of the specific name in the so-called typical subspecies. The vernacular names are very properly given prominence both in position and typography, for they are the names that the bulk of local field students will use. The illustrations consist of well selected half-tones from various sources and several colored plates from the 'Educational Leaflets' of the National Association of Audubon Societies, in which unfortunately the printer has allowed the red tint too much prominence. Attention might also be called to a slip in the title of fig. 10 where the Virginia Rail appears as the Sora, but the book is remarkably free from errors, typographical or otherwise.

The introduction is an especially good piece of work. The life zones of the region are very carefully analyzed and the difficulty in delimiting them clearly brought out. The seasonal variation in bird life is then considered in great detail with the result that we have the species grouped as follows: Permanent Residents 37, Summer Residents 89, Summer Visitants 6, Winter Visitants 30, Irregular Winter Visitants 20, Regular Transients 78, Irregular Transients 21, Casual Visitants 18, Accidental Visitants 66 and Extinct or Extirpated Species 12—a total of 377 species and subspecies. A detailed list of the extirpated species and of 13 of hypothetical occurrence is given in an appendix.

The account of the migrations is perhaps the most important part of the introduction. The season is considered month by month and the successive "waves" described, the spring migrants being arranged in ten groups showing those which habitually travel together. An interesting point in this connection is that today all birds seen in Central Park are migrants, and just as the reviewer has noticed in similar spots in the city limits of Philadelphia, migrating individuals will be seen here long after others

of the same species are settled for the summer in the surrounding country districts, showing that the movement often continues long after we are able to detect it in the open country.

Under "changes in bird life" the author speaks feelingly of the decrease, in many species; of the "improvements" which convert marsh-land breeding haunts of countless birds into city slums as the great metropolis stretches its tentacles out into the country; and the disappearance of breeding birds from city parks. The brighter side of the picture is the recent increase of certain birds due to better protection and the acceptance by many species of the compromise, offered by our suburbs, of conditions intermediate between those of the city streets and the unspoiled country.

Mr. Griscom's book is far more than a local list and it will prove a boon to ornithologists far removed from the New York City Region—indeed it should be in the hands of all field students of the birds of eastern North America.

While neither Mr. Griscom nor the writer oppose the collecting of birds when science requires it, we realize that the necessity for collecting in the eastern states at least, has been greatly lessened. Moreover we shall need in the future for our studies of migration, distribution and behaviour, vast stores of data, far more than could possibly be secured by the collecting of skins and for much of which skins would be useless. These data must come from studies of the living bird and identification of the bird must be rendered as free from error as possible. Powerful binocular glasses now bring the birds reasonably close and constitute the instrument for the work and it remains to teach the observer what characters to look for under these conditions and how to use his collected data for the best interests of ornithology. Toward these ends Mr. Griscom's little book points the way and we congratulate him upon an important piece of work well done.—W. S.

Wardlaw Ramsay's 'Guide to the Birds of Europe and North Africa.'—This little volume[1] fills one of the most conspicuous gaps in ornithological literature. For years we have had inquiries for some handbook in English that might enable bird students visiting continental Europe or the Mediterranean countries, to identify the birds that they saw. There seemed to be nothing in any language except Hartert's larger work 'Die Vögel der palaarktischen Fauna' or the still larger Dresser's 'Birds of Europe,' books which were out of the question, both on account of bulk and cost, but here we have just what people have been asking for.

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[1] **Guide to the Birds of Europe and North Africa. By Colonel R. G. Wardlaw Ramsay, President of the British Ornithologists' Union, 1913–1918. Fellow of the Zoological Society. With a Biographical Memoir by William Eagle Clarke, LL.D. Gurney and Jackson, London: 33 Paternoster Row. Edinburgh: Tweeddale Court. 1923. i–xi + 1–355. Price 12 shillings 6 pence net.**

It is in manual form and covers all of the birds found in the Palearctic region of Europe and Africa. There are brief diagnoses of the orders and families which present their most obvious characters, and descriptions with measurements of all of the species and subspecies which enter the region covered, and a detailed statement of distribution, including both the breeding and winter ranges in the case of migrants. The systematic arrangement is that of Hartert's 'Die Vögel der palaarktischen Fauna,' but the nomenclature does not always follow that work. An important feature is the addition to the English name of the French, German, Italian and Swedish vernaculars where they exist. A good index aids one in finding any desired species.

This work is of course not a book for beginners and has no artificial keys for determining species but any one familiar with the birds of Great Britain, or of the United States, and accustomed to handle any of the standard manuals will find it just what he needs when travelling in Europe or in the northern countries of Africa.

There are some points in the nomenclatural treatment which will not suit everyone especially the plan of printing the first of a series of trinomial forms—races of the same species—in heavy type and the rest in smaller size. It naturally gives the impression that their rank is different whereas they are all equal. This is especially confusing to the uninitiated in cases like that of the Canary where *Serinus canarius serinus* stands at the head of the forms, in heavy type, while *S. c. canarius* follows below, in lower case. We also object to the habit so frequent on the part of British authors of coining special names for North American birds, which are never used in America, as for example, "Water Pipit" for our *Anthus*, and "American Stint" for our Least Sandpiper, but these are really minor matters.

The late Col. Ramsay had conceived this work sometime before his death and had completed the greater part of it, but realizing that he would be unable to publish it himself he entrusted it to his friend Dr. W. Eagle Clarke to do with as he thought best. To Dr. Clarke and to Rear Admiral Stenhouse we are indebted for its prompt appearance and to the former also for a brief biographical sketch and portrait of the author, who will be remembered as president of the British Ornithologists' Union and nephew of the Marquis of Tweeddale.—W. S.

Fitzsimmons' 'Birds of South Africa.'—The two attractively gotten-up volumes[1] of this work form part of the author's 'Natural History of South Africa.' The title is unfortunately misleading as the birds are considered almost exclusively from an economic standpoint and he who

[1] The Natural History of South Africa. By F. W. Fitzsimmons. F. Z. S., F. R. M. S., etc. Director, Port Elizabeth Museum. Birds, in two volumes. With 10 coloured plates and numerous illustrations from photographs, etc. Longmans, Green and Co. 39 Paternoster Row, London, E. C. 4. New York, Toronto, Bombay, Calcutta, and Madras. 1923. Vol. I, pp. i-xvi, + 1-288. Vol. II, pp. i-vii, + 1-323. Price $4.00 net each volume.

may secure the book for the purpose of identifying South African birds or of learning something of the general character of the avifauna will be disappointed.

As an economic work however it is excellent and Volume I sets forth the whole problem of bird conservation, the birds' part in suppressing insect life and the food habits of the more familiar species, in a most convincing way. To those who have interested themselves in bird conservation in America this work will be read with the greatest interest. Although the environment is totally different and also the make-up of the avifauna, the problems are almost identical, and the same methods will prove effective in meeting them, as have been employed here.

The native kafir boys who destroy so many birds for food have their counterpart in our southern negroes and the immigrant Italians in the north, while the farmers who destroy bird "pests" before they learn the economics of the problem, are the same in both countries. In this connection it is interesting to find many quotations from the work of the U. S. Biological Survey and the publications of Mr. Edward Howe Forbush, as well as from American poets.

South Africa would seem to be far behind us in educational work in behalf of conservation and Mr. Fitzsimmons' book will do a world of good if only its contents can be spread broadcast through the public press, for it seems to be too expensive a work to reach the people who should benefit from it.

Volume II has rather a peculiar make-up. Instead of a systematic treatment of the entire avifauna of South Africa we have three separate lists. First; a 'List of South African Birds and their Diet,' in which the units considered are sometimes species, and sometimes genera or even higher groups. Then comes 'Descriptions, distribution and habits of the birds figured in Vols. I and II." The information here given is brief and of the nature desired in a popular hand book but only a comparatively small number of the species are considered—about 150. Finally comes a nominal list of 926 species and subspecies with technical and common names on different lines and the former in heavy type, so that it covers many pages —nearly half the book in fact, whereas it and the preceding lists could have been combined with a great saving of space and greater ease of consultation.

General ornithological problems apart from the economic ones are barely touched upon. We do find however that brilliant male plumage is explained upon the time-honored theory of competitive display, while it is suggested that species with the most brilliant males are probably polygamous or the males have different mates in different years, and yet Mr. S. P. Baldwin has demonstrated that the modestly colored House Wren, in which the sexes do not differ in color, is notorious in changing mates.

The illustrations in Mr. Fitzsimmon's work consist of nine beautiful colored plates from Layard and Sharpe's 'Birds of South Africa' and one from 'The Ibis,' together with a number of half-tones mainly from mounted

specimens which have often apparently been set out amidst natural surroundings, although these facts are not mentioned. There are also some good pictures from life of the Gannet rookeries of Bird Island and Ostriches on an Ostrich farm.

Mr. Fitzsimmons' book should accomplish much for the conservation of bird life in South Africa and we regret that its real mission could not have been brought out in the title.—W. S.

Dr. Townsend's 'Beach Grass.'—Dr. Charles W. Townsend, whose delightful volumes on Labrador and Ipswich beach have given enjoyment to so many lovers of nature and the great out doors, has just published another book[1] under the title of 'Beach Grass' which consists of further chronicles of the Ipswich dunes and uplands and is illustrated by many half-tones from photographs by the author.

While birds figure here and there throughout the text four chapters deal exclusively with bird life—'A Winter Crow Roost;' 'Courtship in Birds;' 'Hawking' and 'Swallows at Play.' The first two appeared previously in 'The Auk' and much of the third in the 'Bulletin of the Essex County Ornithological Club.' The chapter on Swallows deals with the life history of the Barn and Tree Swallows, two species especially characteristic of the sea coast, and Dr. Townsend's observations will prove most interesting reading to those who have studied these birds at other points on the Atlantic seaboard.

The description of the flock of migrants in the dune thickets in Chapter I, is a vivid picture of autumn migration as we find it near the coast, while the account of the courtship performances of the Terns is one of the best we have read. These are the more important ornithological contributions but a good index directs one to many other observations on various species of birds.

Of more general interest are the accounts of the dunes and the ice formations of winter; the tracks of birds, beasts and insects in the sand and the development of a 'forest' on a twelve acre lot of grass-land by the salt marsh. All of these are interesting, while throughout the book as we read Dr. Townsend's vivid descriptions of nature in her several garbs and under varied weather conditions, we seem to catch the salty smell of the sea, to feel the winds sweeping the sand before them and to hear the boom of the surf on the beach.—W. S.

Laimbeer's 'Birds I Have Known.'—This is the story of a man who took up bird study rather late in life as a result of a realization of the threatened destruction of many of our familiar species and who desires to tell us all about it. The key note of the volume[2] is the cultivation of an intimacy

[1] Beach Grass. By Charles Wendell Townsend, Boston, Marshall Jones Company. (212 Summer St., Boston) 1923. 12 mo. pp. i–xii + 1–319, 82 illustrations. Price $3.50.

[2] Birds I Have Known. By Richard Harper Laimbeer. Illustrated with 50 Colored Plates and with 48 Snapshots from Life by the Author. G. W. Putnam's Sons, New York and London, The Knickerbocker Press. 1923, pp. i–xviii + 1–401 Price $4.00.

with wild birds and methods of attracting them in which the erection of shelter and feeding stations comes in for much consideration. Naturally those birds which most readily respond to man's overtures figure most prominently in the text. The photography of birds soon occupied the author's attention and the original illustrations from his camera are excellent, many of them demonstrating his ability to reach a perfect understanding with his feathered friends, as witness the Towhee sitting on the open book that he holds in his hand and the Chipping Sparrow perched on his cigar.

The first three chapters treat of equipment and methods, etc., while chapters four to nine cover such subjects as mating, nesting, molting, migration, song, etc. When the author comments upon these topics on the basis of his personal experience his remarks are of value but when he thinks it necessary to discuss the broader problems on the basis of books he has read they are not so happy. He evidently fails to distinguish between the reliable and unreliable, or between the older and more modern works, and consequently is sometimes misled. He does not, for instance, regard the method of plumage change as proven and makes a curious statement that the Goldfinch changes color in the fall while the Bobolink and Tanager change "during the molt." Of course they all change "during the molt" but the Goldfinch being a very late breeder does not molt until much later than the other species. Molt and color change are subjects which require specimens and are thus outside the field in which the author is especially interested. Still more remarkable is his statement that some birds not only have "one suit for summer wear and one of distinctly different color for winter use, but in different parts of the country various colors may be provided." Surely he has misinterpreted what he has read in this case. Again he states that altricial birds are hatched "absolutely free from covering of any sort except the bare skin." How he could have examined so many nests without noting the natal down exhibited by most species, and so remarkable in the case of the Kingbird, it is difficult to understand. The author's occasional slur upon the literature of ornithology is not in the spirit of one interested in the advancement of knowledge and is usually quite unwarranted. For instance he says: "Any dissertation by me on bird migration based upon personal knowledge would be very brief . . . that the birds came and went away again, which if not rich in detail would be at least as authentic and as prolific of information as much that has been written . . one guess is quite as likely to be right as another." [!]

The latter half of the book is devoted to accounts of a number of familiar Long Island birds arranged, according to the author, in alphabetical order but the fact that Blue Jay comes under "B" and Purple Grackle under "G" with other similar violations of the proposed scheme makes it difficult to find any given bird and it would have been better to follow the recognized sequence. These accounts contain many interesting original obser-

vations and much from the oft-quoted publications of the U. S. Biological Survey. It would have been better had the author also quoted his descriptions of the birds from a standard authority since the color terms used often vary so widely from those usually employed as to be confusing. His Bobolink's eggs moreover if really "white spotted with brown" must have belonged to some other species of ground nesting bird.

This work contains so much interesting and original matter that it is a pity that the manuscript could not have been read critically by some ornithologist familiar with the broader aspects of the study, but apart from slips in the more technical side of the subject it will furnish interesting reading for the popular bird student and will do much to attract others to the field that the author has found so interesting.

The book is beautifully gotten up and the half tones and the colored plates from the Audubon Society leaflets are remarkably well printed.—W. S.

Dr. Cordier's 'Birds: Their Photographs and Home Life.'—This[1] is another of the popular 'bird books' with which the market at present seems to be filled. Dr. Cordier makes no claim for his book as a complete treatise on the birds of any given locality and only those with which he has come into photographic contact in their natural feeding and breeding haunts are considered. Dr. Cordier, moreover, wisely confines himself to his personal experiences and does not, in an attempt to cover the whole field, rehash the work of others.

Although a big game hunter himself, he seems to be unable to realize the possibilities of a similar enthusiasm on the part of a collector of birds and scores the amateur collector roundly. However we nearly all agree that today the collecting of birds in the United States, except on the part of the technical investigator or representative of the large museum, is unnecessary, but many of his strictures apply just as well to the hunter of big game animals, and not a few big game hunters have abandoned the slaughter in favor of photography.

Several chapters in Dr. Cordier's book are devoted to methods in bird photography with many useful hints about cameras, lenses, etc., and then follow accounts of trips to bird rookeries in Florida and on the Texas coast and finally sketches of the habits and habitats of various birds which the author has studied, which contain not a few notes and observations of interest, while the 140 half-tones give evidence of his ability as a photographer. The few pictures taken from chloroformed birds or dead birds had better have been omitted as they are but sorry substitutes for photographs from life and at once invite criticism.

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[1] Birds: Their Photography and Home Life. By A. H. Cordier, M. D. With 145 illustrations from Photographs of Wild Birds by the Author. Dorrance & Co., publishers. Philadelphia (308–310 Walnut St.) 1923. pp. 1–247. Price $4.00, post paid $4.15.

This book will doubtless be read with interest and profit by the increasing army of bird students who follow their hobby with the aid of the camera.—W. S.

Payne's 'The Baltimore Oriole.'—This handsomely printed little book,[1] which has about it the appearance of authority, unfortunately contains so many misquotations and pieces of misinformation that one wonders how it could have been compiled in these days of accurate ornithological knowledge.

From the astonishing Canary-colored Oriole of the frontispiece and cover, to the sketch of Audubon based on the antiquated and discredited life by Buchanan, errors are numerous. The author has apparently never heard of Herrick's life of Audubon and the extracts from Audubon regarding the Oriole, although enclosed in quotation marks, are unfortunately not verbatim and are often pieced together. Moreover the great ornithologist is made to say that the birds "attain the full beauty of their plumage before the first winter" whereas as a matter of fact he says the "plumage is not mature until the third spring." The latter part of the remarkable statement "They lay 4–6 eggs and in the far south *near two brooks*" proves to be, when the original is consulted, "and in Louisiana *rear two broods.*"

These and other quotations are, we are informed, taken from the "Elephantine Edition" and we learn that the economic value of the Oriole was "demonstrated scientifically by the admirable Biological Survey made by the Government in the Department of Agriculture." [!]

Why do not publishers consult some competent ornithologist and have such works properly revised before launching them upon the public?—W. S.

Johnston's 'Birds of West Virginia.'—The West Virginia Department of Agriculture has issued an attractive book[2] on the birds of the state by the state ornithologist, I. H. Johnston. The main text consists of accounts of forty of the best known species covering nesting, range, food and general habits. Each one is illustrated by a figure in colors from paintings by Louis Agassiz Fuertes printed as inserts in the text. While these are excellent portraits of the birds the printer has unfortunately in several cases gotten the colors out of register so that a blurred effect is produced like a lantern slide out of focus, which is most unfortunate.

The text that the author has furnished is fully up to the requirements and is followed by a nominal list of all the birds of the state to which is added a general account of the economic value of birds with methods of attracting them, suggestions for bird study in the schools and a chapter

[1] The Baltimore Oriole and a Biographical Sketch of Audubon. By Raphael Semmes Payne, Baltimore. The Norman, Remington Company. MCMXXIII. pp. 1–55. Price $1.00.

[2] Birds of West Virginia. Their Economic Value and Aesthetic Beauty. 1923. I. H. Johnston, State Ornithologist. Compiled and Published by State Department of Agriculture, Charleston. J. H. Stewart, Commissioner. pp. 1–138 (140).

on the methods and possibilities of bird banding, several migration records and a bibliography. The domestic cat comes in for just censure and it is such evidence and publicity as are here given that will ultimately break down the prejudice in favor of cats and permit us to pass laws to prevent their free roving and so eliminate one of the worst menaces to wild bird life. Mr. Johnston is to be congratulated upon an admirable piece of work. —W. S.

Eliot's 'Birds of the Pacific Coast.'—This little volume[1] is intended to serve the purpose of a popular handbook for those who have but limited time for outdoor study and desire a short cut to a knowledge of the common birds of the woods and fields.

It consists of colored figures of all of the 118 species treated, with brief accounts of their habits and habitats and a concise statement of distribution and sometimes of coloration, the length, in inches, of each species being given immediately after the name. Allied subspecies are mentioned in the text usually without description, and unfortunately referred to as "species."

The work would seem to answer the purpose for which it is intended quite well and will doubtless aid many a beginner to a knowledge of the common birds of the "Coast", but we are sorry that fuller descriptions could not have been given especially in the case of such birds as the Sharp-shinned Hawk and others where the adult only is figured and described, whereas many specimens encountered will probably be immature. Mention of the best field characters could also have been added with advantage, the trouble with most of our popular books being that the descriptions are of specimens in hand whereas the student wants the characters of the live bird at some distance. A nominal list of all the birds of the Pacific Coast is added with the states in which each occurs.

The nomenclature throughout wisely follows the A. O. U. 'Check-List' but unfortunately the sequence of species follows "a whimsical plan" of the author's without regard to their proper order. This is regrettable as those who use the book will later secure a more advanced work and be bewildered to find the order with which they have become familiar completely upset.

The author's plan to pick out the most familiar birds has been well carried out and the work therefore deals mainly with the Passeres and "Picariae" with a few birds of prey, gallinaceous and aquatic species. The plates by Bruce Horsfall vary much in artistic merit but are mainly quite satisfactory for purposes of identification although owing to careless printing the colors in a number of instances are off register and produce

[1] Birds of the Pacific Coast. Including a brief account of the distribution and habitat of one hundred and eighteen birds that are more or less common to the Pacific Coast states and British Columbia, many of which are found eastward to the Rocky Mountains and beyond. By Willard Ayres Eliot. With fifty-six color plates by R. Bruce Horsfall. G. W. Putnam's Sons. The Knickerbocker Press. New York and London. 1923. pp. i-xvii + 1-211. Price $3.50.

blurred figures. The general make-up of the book is excellent but we do not like to see bird names, especially in a bird book, printed with lower case initial letters.—W. S.

Wood's 'Birds of North Dakota.'—It is always a pleasure to welcome a State list[1] for a state that has hitherto been without such an ornithological necessity, as has been the case with North Dakota; and especially welcome is a list prepared with the care that Mr. Norman A. Wood has devoted to the publication before us. He has modestly entitled it a "Preliminary Survey" and doubtless much additional field work will be necessary before the bird-life of every part of this state is known, but it is safe to say that the present list will serve the purposes of the ornithologists of North Dakota for some years to come.

The field work was carried on by Mr. Wood under the joint auspices of the Biological Station of the University of North Dakota and the Museum of Zoology of the University of Michigan, the report being published as Miscellaneous Publication No. 10 of the latter institution. Collecting trips were made to half a dozen counties in widely separated parts of the state, various collections have been examined and many unpublished records secured, while the literature bearing on the birds of the state has been most carefully examined.

The bibliography seems very complete and we can find at the moment only two additional titles: a record of the capture of a Band-tailed Pigeon in the state (Shufeldt, 'Auk' 1912, pp. 539–540) which may perhaps have been purposely omitted by Mr. Wood on the basis of additional information though it should have been in the list of papers, and a popular article on 'Some Lakeside Waders of the Northwest,' by H. K. Job (Outing, September, 1906). It may also be worth while to mention that the collection made at Pembina by Dr. W. L. Abbott was presented by him to the Academy of Natural Sciences of Philadelphia where it is still preserved and available for consultation.

Mr. Wood presents a brief historic summary of early ornithological work in North Dakota and an account of the physiographic features of the state, then follows the annotated list of 321 species and subspecies.

Under each is a brief statement of its occurrence from the earlier writers and a fuller account of the experiences of Mr. Wood and his correspondents, so that one has here in concise form a summary of our present knowledge of the occurrence of the bird in the state.

In the preliminary pages the author emphasizes the rapidity of the changes which man has wrought. In twenty years time the whole character of the country has been altered and with cultivation and drainage many species of birds have left or become very scarce while others of different types have increased.

[1] A Preliminary Survey of the Bird Life of North Dakota. By Norman A. Wood. University of Michigan, Museum of Zoology, Miscellaneous Publication No. 10. Ann Arbor, Michigan. Published by the University, July 2, 1923 [received October]. pp. 1–96 with six plates and a map.

Six half-tone plates illustrate many nests and nesting birds and show several characteristic types of North Dakota scenery.—W. S.

Mathews' 'The Birds of Australia.'—The first part of Volume XI[1] contains the genera *Falcunculus, Oreoica, Aphelocephala, Sphenostoma,* and one species of *Neositta.* Part 2 completes the Nuthatches and Creepers. No new forms are described in either instalment.—W. S.

Kirke Swann's 'Chronological List of British Birds.'—This brochure[2] which is published as a supplement to Mullen's and Swann's 'A Bibliography of British Ornithology' aims to present the names of all the species and subspecies of British birds arranged in the order of their description in scientific literature. There is also a list of genera on the same plan and of the principal generic and specific names which have been discarded.

All bibliographic works have their interest and while the reviewer has in the past considered the advisability of such a list of American bird names he came to the conclusion that if effort were to be expended on such a list it would be better to make it a chronological list of the first mention of each bird in literature rather than a list of the accepted names. A list of the latter type is always subject to change. For example the British Bullfinch naturally does not appear in Mr. Swann's work until 1917, when it was first given a distinctive trinomial name, but it was known in literature at least 200 years earlier and had Mr. Swann written ten years ago when it was regarded as identical with the continental form it would have been entered at 1758.

However these remarks in no way reflect upon the excellence of this little book and the care that has been bestowed both upon its compilation and printing. It is but fitting that a bibliography should be a fine piece of printing and this is distinctly so in the present case.—W. S.

Finley on Hunting Birds with a Camera.—When bird photography is mentioned one naturally thinks of Mr. Finley and in the August issue of the 'National Geographic Magazine' he has published an account[3] of his experiences in hunting birds with a camera that will interest all bird students especially such as "take pictures."

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[1] The Birds of Australia. By Gregory M. Mathews. Volume XI, Part I. H. F. and G. Witherby, 326 High Holborn, London W. C. 1. October 8, 1923. pp. 1–56, Plates 491–496. Part 2. November 21, 1923. pp. 57–120, plates 497–502.

[2] A Bibliography of British Ornithology from the Earliest Times. Supplement. A Chronological List of British Birds. By H. Kirke Swann, F. Z. S., M. B. O. U., & c. Corresponding Fellow of Amer. Orn. Union. London. Wheldon and Wesley, Ltd., 2, 3 & 4 Arthur Street, New Arthur Street. 1923. pp. i–xvii + 1–42. Price 5 shillings net.

[3] Hunting Birds with a Camera. A Record of Twenty Years of Adventure in Obtaining Photographs of Feathered Wild Life in America. By William L. Finley. With Illustrations from Photographs by H. T. Bohlman, Irene Finley and the Author. Reprinted from the National Geographic Magazine, August, 1923.

The half-tone illustrations from the author's own photographs exhibit some of the best of his work and are striking presentations of bird activities as well as works of art.—W. S.

Hartert's 'Die Vogel der palaarktischen Fauna.'—The first supplement to Dr. Hartert's famous work[1] on the birds of the palearctic region appeared early in the autumn and consists of additional races and species described since the close of the work as well as additional notes on distribution, etc. Everything available has been included up to January, 1923. There seem to be no new forms described in the present supplement—.W. S.

Chapman on Mutation in Buarremon.—This paper[2] is the outcome of a study of two species of the genus *Buarremon—B. brunneinucha* and *B. inornatus* which differ from one another only in the extent of white on the under surface and the presence or absence of a black pectoral band. The former bird is wide ranging and exhibits individual variation in the characters above mentioned while the latter occupies a very limited area in the subtropical zone of western Ecuador where *B. brunneinucha* is unknown, though it is present in western Ecuador to the north and south.

Dr. Chapman maintains that there is a tendency in *B. brunneinucha* to a greater extention of white below and to the disappearance of the pectoral band, and that isolation, in the case of individuals with this tendency strongly present, has resulted in the distinct species *B. inornatus* which is not dependent upon climatic or other observable environmental factors for its origin. In other words it is a mutant of *B. brunneinucha*. Continuing his investigations to other groups of the genus he finds that the races of *B. assimilis* exhibit variations in head markings correlated to a large extent with geographic distribution but so variable locally as to suggest that the several races owe their existence to a tendency to vary in these characters rather than to the direct action of environment. In other words the characters in question are mutations which under favorable conditions become of subspecific value. The potentiality for abrupt variation, independent of environment, is further shown by the occurrence of a black banded individual in the heart of the range of the white breasted *B. assimilis* which so far as color is concerned is identical with *B. poliophrys* of central Peru.

In his summary Dr. Chapman says that in his opinion the presence or absence of a pectoral band, vertical streak or superciliary line does not materially affect a species' chances of success or failure and that natural selection has played no part in their development. It is encouraging to

[1] Die Vögel der palaarktischen Fauna. Systematische Ubersicht der in Europa, Nord-Asien und der Mittelmeerregion vorkommenden Vögel. Von Dr. Ernst Hartert. Nachtrag I (bis Januar 1923) Berlin. (NW 6, Karlstr. II.) Verlag von R. Friedländer & Sohn. September, 1923. pp. 1–92.

[2] Mutation Among Birds in the Genus Buarremon. By Frank M. Chapma.n Bull. Amer. Mus. Nat. Hist. Vol. XLVIII, Art. IX, pp. 243–278. October 15, 1923.

find ornithologists attempting to explain the origin of species instead of resting satisfied with describing a new one. We see no flaw in Dr. Chapman's argument nor do we think anyone seriously consideres that external environment ever produced such differences. The recent tendency to regard *all* subspecific differences as due to "mutation" however has received a timely setback by Dr. F. B. Sumner, as noticed below (p. 187). —W. S.

Chapman on New South American Birds.—Continued studies of the Ecuadorean collections of the American Museum obtained under the direction of Dr. Chapman have resulted in the discovery of a number of hitherto undescribed forms which he names and describes in the paper[1] before us. They are from Venezuela, Ecuador, Panama, Colombia, Peru and Bolivia; and belong to the families Dendrocolaptidae and Formicariidae. The following genera are represented, one new form of each being described unless otherwise indicated: *Thamnophilus* (3); *Myrmotherula, Microbates, Myrmoderus, Hylophylax, Grallaria, Schizoeaca, Synallaxis* (2), *Siptornis* (2); *Pseudocolaptes, Philydor, Xenicopsis, Xenops, Sclerurus, Glyphorhynchus* and *Lepidocolaptes.*—W. S.

Chapin on the Olive Ibises.—A very careful review[2] of the Olive Ibises of Africa has recently been published by Mr. James P. Chapin. He recognizes three closely related mainland forms *Lampribis olivacea, cupreipennis* and *akeleyorum* and two others from islands in the Gulf of Guinea—*L. rothschildi* from Princes Island and a new form *L. bocagei* (p. 5) from Sao Thome, smaller than any of the others. The very distinct *L. rara* also belongs to this genus but forms a group by itself which fact will no doubt induce someone in the near future to do what Mr. Chapin has wisely refused to do, i. e., provide it with a distinct generic name.—W. S.

Recent Papers by Penard.—Mr. T. E. Penard in his studies of Surinam birds has discovered several new forms which he has described from time to time.

One of them *Tanagra chrysopasta nitida* (p. 63) from Lelydorp[3] is a representative of the Golden-bellied Euphonia of Peru, a type never before recorded from Surinam or the Guianas. The Surinam race of *Sporophila schistacea*[4] is also found to be separable and is named *S. s. arthuri* (p. 60) the type also from Lelydorp. The relationships of several other species of *Sporophila* are also discussed in the same paper.—W. S.

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[1] Descriptions of Proposed New Formicariidae and Dendrocolaptidae. By Frank M. Chapman. American Museum Novitates No. 86. August 28, 1923. pp. 1–20.

[2] The Olive Ibis of DuBus and Its Representative on Sao Thome. By J. P. Chapin. American Museum Novitates. Number 84. August 9, 1923.

[3] A New Tanager from Surinam. By Thomas E. Penard. Occasional Papers of the Boston Society of Natural History. Vol. 5, p. 63, June 8, 1923.

[4] Status of Spermophila schistacea Lawrence. By Thomas E. Penard. Proc. Biol. Soc. Washington, Vol. 36, pp. 59–62, March 28, 1923.

Silloway on Summer Birds of the Adirondack Forest.—This report[1] on the relation of summer birds to the western Adirondack forest is the result of studies carried on under the auspices of the Roosevelt Wild Life Forest Experiment Station at the camp at Cranberry Lake. There is a list of 101 species preceded by a detailed consideration of the birds definitely associated with each species of forest tree a rather novel method of treating the subject.

The author concludes that each species of forest tree exerts its own particular influence upon bird life and to some extent each component of a vegetative association is effective in attracting one or another of the group of birds recognized to be closely related to it. The paper is illustrated by Mr. E. J. Sawyer's attractive little groups of birds printed in colors, representing in the present report birds of the hard wood forest, the burned forest, the bog coniferous forest and the virgin mixed forest.—W. S.

Van Oort's 'Birds of the Netherlands.'—We have just received a large instalment[2] of this notable work consisting of forty-one beautiful plates illustrating the Skuas, Gulls, Terns, Auks, Pigeons, Cuckoo, Swift, Roller, Kingfisher, Bee-eater, Hoopoe and some of the Woodpeckers. These we understand are from paintings by M. A. Koekkoek and as heretofore all of the plumages due to season or age are pictured so that there are often from five to nine figures of a single species. These will prove very valuable to American students in the case of the Gulls and Terns many of which are identical with, or very close to, American forms. This instalment practically completes the plates of the third of the proposed five volumes, the text of which is to follow shortly, which leaves only the Passerine birds with 140 plates to be issued. We congratulate the author and publishers upon the excellent progress which they are making with this work which as we have said before has an interest extending far beyond the borders of Holland.—W. S.

McAtee on Local Names of Migratory Game Birds.—This publication[3] lists and indexes the vernacular names that have been used for American Waterfowl, Shorebirds, Pigeons, Doves and the Bobolink, a subject that was covered, in part, by Gurdon Trumbull in his 'Names and Portraits of Birds Which Interest Gunners' and the fact that Mr.

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[1] Roosevelt Wild Life Bulletin Vol. I. No. 4, of the Roosevelt Wild Life Forest Experiment Station of the New York State College of Forestry, Syracuse, N. Y. pp. 387–526. March, 1923.

[2] De Vogels van Nederland door Dr. E. D. Van Oort. 's-Gravenhage. Martinus Nijhoff. Afll. 20–23. November, 1923. pll. 190–196, 209–210, 215–232, 234–236, 238, 248–250, 252–256, 258–259. Price per part of ten plates and text 15 guilders. (sold only by subscription to the entire work. Vol. I bound in half morocco 244 pp. and 87 pls. 160 guilders.)

[3] Local Names of Migratory Game Birds. W. L. McAtee, U. S. Dept. of Agriculture Miscellaneous Circular No. 13. October, 1923. pp. 1–95 with 52 text figures. Price 20 cts. Supt. Documents, Govt. Printing Office, Washington, D. C.

McAtee has been enabled to use the illustrations which were made for that work by Edwin Sheppard makes his publication all the more like a second edition of Trumbull. But for the families covered Mr. McAtee has treated nearly three times as many species, and lists more than twice as many names.

Under each species is given its range; then, names in general use; names in local use; and finally a rearrangement of both under states and Canadian provinces considered alphabetically. The list the author tells us is for the information of sportsmen, naturalists, wardens and others interested in the identification of migratory game birds, and he makes an appeal for any additional names that those who read the list may be able to furnish, as well as vernacular names for any other birds. The list represents an immense amount of work and is admirably arranged. We especially appreciate the foot notes which explain the scientific names used by the U. S. Biological Survey in terms of the A. O. U. 'Check-List.'

We often hear our scientific nomenclature criticized for its changeableness and the recommendation is made that the more stable vernacular names be adopted. If anyone seriously thinks that vernacular names are uniform let him study this list in which, if we count correctly, the Ruddy Duck has no less than 92 names, while we estimate that the pamphlet lists about 4800 names distributed among about 180 species. Having gone so far Mr. McAtee richly deserves assistance from anyone who can add to his list. Many of the names originated with the old market gunners who "were men of originality and force of character and names invented by them had interest, charm or humor—a tang of the boisterous out-of-doors in which they were conferred." With the laws stopping professional gunning these men will soon be gone forever, and if the names they proposed are not collected now they will be lost.—W. S.

Grinnell on the Birds of Death Valley.—Thirty years have now elapsed since the appearance of Dr. Fisher's report on the birds of the Death Valley Expedition conducted by the U. S. Biological Survey, and as practically nothing has been published in the interim on bird life in this interesting region, Dr. Grinnell's paper[1] is most welcome. He has restricted the area covered as compared to that included in Dr. Fisher's account, and considers only the portion of the valley which lies below sea-level, (0 to --280 ft.). This is Lower Sonoran in its zonal affiliation and belongs to the Colorado Desert subdivision while it is completely surrounded by the Mohave Desert subdivision of the same zone. We have therefore as Dr. Grinnell suggests a desert mountain range inverted, the area below sea-level being analogous to a boreal island on the top of a high mountain and just as the latter is cut off from any communication with similar areas on the tops of other mountains, or from the main boreal area to the north,

[1] Observations upon the Bird Life of Death Valley. By Joseph Grinnell. Proc. Calif. Acad. Sciences. Fourth Series. Vol. XIII, No. 5, pp. 43–109, 1 text figure. November 6, 1923.

so this Death Valley region is cut off from the rest of the Colorado Desert area by the "higher" Mohave Desert belt which surrounds it and this barrier has prevented many species characteristic of the Colorado Desert from entering, although there is no doubt but that they could flourish in the Death Valley had they been able to spread into it. The region is therefore an extremely interesting one from the standpoint of zoogeography.

The Furnace Creek Ranch presents another interesting feature. It consists of about sixty acres which are kept under cultivation by irrigation and forms a green oasis in the desert, like an island in the sea, which attracts migrant birds just as does the island of Heligoland in the North Sea, and Dr. Grinnell thinks that if regular observations could be maintained here during the migratory flights the results might be quite as interesting.

The main part of the report consists of an annotated list of 124 species based upon two trips by the author in April and May, 1917 and April 1920, and all published and unpublished matter that could be found. Of the list 25 species are regarded as casuals, 45 as regular transients, 32 winter visitants, 10 summer visitants and 12 residents. The last consist of the Prairie Falcon, Burrowing Owl, Road-runner, Say's Phoebe, Western Raven, California Linnet (House Finch), Leconte's Thrasher and Rock Wren, all wide-ranging in the area, the Killdeer and Western Meadowlark which depend upon the maintenance of the ranch, and the introduced Desert Quail and English Sparrow. Only one of the summer visitants is known to breed, namely, the Bullock's Oriole, which is also dependent upon the ranch; so that there are now only 13 species known to breed in the below-sea-level area. Other interesting features of the paper are the lists of actual censuses which, as the author truly says, give one the best idea of relative abundance of species; and the weights of specimens which we are informed are as useful as measurements in distinguishing closely related forms.—W. S.

Bailey on Birds of the Santa Rita Mountains, Arizona.—As is well known to the readers of 'The Auk,' who have read Mrs. Bailey's delightful contributions on the birds of the Santa Ritas, she and her husband, Vernon Bailey of the U. S. Biological Survey, spent the period from November 1920 to May 1921 at McCleary's Ranch in this range. The interest thus aroused in the avifauna of these mountains and the fact that no satisfactory account of it had been published, have induced Mrs. Bailey to review the ornithological history of the Santa Ritas, to examine critically the several collections made there and to prepare a comprehensive account of the bird life which has just been published by the Cooper Club as Pacific Coast Avifauna No. 15.[1]

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[1] Birds Recorded from the Santa Rita Mountains in Southern Arizona. By Florence Merriam Bailey. Pacific Coast Avifauna Number 15. Cooper Ornithological Club. Berkeley, Calif., November 8, 1923. pp. 1–60, figs. 1–4. Price $1.50 (W. Lee Chambers, Bus. Mgr., Eagle Rock, Calif.)

The introduction consists of a historical résumé of work done in the mountains from 1872, when Bendire first entered them, to 1923; a brief account of the more striking physical features, and several lists of species seen or collected by some of those who have worked in the region. Then follows an annotated list of 174 species, with records of specimens taken by earlier collectors, mainly hitherto unpublished and short accounts of habits and abundance from Mrs. Bailey's personal observations. The work forms a valuable record of the bird life of this interesting range which may now be accurately compared with that of the Huachucas and Santa Catalinas which have already been published upon, and in conjunction with Mrs. Bailey's articles on the habits of the species ('Auk', 1922, p. 424 and 1923, p. 373) gives a pretty clear picture of the avifauna.—W. S.

Trotter on the Origin and Relationship of American Song Birds.—In this paper[1] Dr. Trotter reviews the opinions of various authors as to the difficulty of clearly delimiting the accepted families of the Oscines, pointing out which are clearly defined groups and which are not, as well as which are apparently primitive and which derived types. He also contrasts the classification of the Passeres and the Colubrine snakes noting that the characters used to distinguish families in the former are of about the same rank as those used for generic separation in the latter.—W. S.

Reichenow on a Collection of Birds from the Upper Congo.—Dr. Reichenow's retirement from his professional ornithological responsibilities has not affected the continuance of his researches as evidenced by the present paper.[2] This is a report on a collection obtained in the Lualaba District of the Upper Congo by L. Frobenius. Thirty-three forms are listed of which two are described as new; *Colius leucotis congicus* (p. 3) and *Ploceus cucullatus frobenii* (p. 4). *Vanga cristata* (p. 5) from Nossibe Island is also described.—W. S.

Sumner on the Origin and Inheritance of Specific Characters.—The subject of this recent paper[3] of Prof. Sumner's is of interest to the increasing number of ornithologists who are concerning themselves with the broad problems of the origin of species and even if mainly based upon a study of mammals it applies equally to birds and should be read by ornithologists. Many of us will be pleased with his opening statement that "it seems reasonable to suppose that the geographic races or 'subspecies'

[1] An Inquiry into the Origin and Relationship of Certain North American Song Birds. By Spencer Trotter. Transactions of the Wagner Free Institute of Science of Philadelphia. Vol. X, 1923, pp. 29–41.

[2] Ueber eine Vogelsammlung vom oberen Kongo und eine neue Wurgerart von der Insel Nossibe. Von Ant. Reichenow. Sonderabdruck aus: Mittl. aus dem Zoologischen Staatsinstitut und Zoologischen Museum in Hamburg. XL. Jahr. 1923.

[3] Some Facts Relative to a Discussion of the Origin and Inheritance of Specific Characters. By Dr. F. B. Sumner. American Naturalist, Vol. LVII. May–June, 1923.

of mammals and birds represent early stages in the differentiation of species," and also with his reply to the suggestion that since many organisms are differently influenced by different environments within the limits of the individual lifetime, may not this be true of subspecies? To this he says that for the genus *Peromyscus* he has offered detailed disproof of such a contention.

At the conclusion of his paper he says: "The upshot of my discussion is that we are not yet prepared to frame any adequate general hypothesis as to species formation . . . and it is my belief that the facts of geographic variation will bulk as large in the end as those of Mendelian inheritance." This is particularly significant coming from a geneticist who has carried on abundant experiments and is not merely discussing theories and possibilities.—W. S.

Stoner on the Apteryx.—In a recent paper[1] Prof. Dayton Stoner describes the habits of *Apteryx mantelli* as observed by him in the zoological park at Wellington, New Zealand, and presents some general information about this interesting bird.

When handled it hisses and kicks forward with its powerful feet. Its nest is a hole in a bank, excavated in part by the female, while the male incubates the single (sometimes two) egg. The young are hatched in a helpless condition but develop rapidly.—W. S.

Lewis on the Birds of Antigonish, Nova Scotia.—Mr. Harrison F. Lewis has published a list[2] of the birds of Antigonish County based upon a residence there from August, 1913 to June, 1914. While the title indicates only migration data the paper is really an excellent annotated list of the birds observed. It comprises 91 species with rather detailed discussion of some of them. It should prove a valuable addition to the literature of Nova Scotia birds.—W. S.

Bannerman on Birds of the Ivory Coast.—This paper[3] is an account of the collection made by the British Museum expedition to the Ivory Coast of French West Africa under the leadership of Mr. Willoughby P. Lowe, who as it happened did practically all of the work. He has submitted an account of the itinerary and field work while Mr. Bannerman presents a list of the species which is fully annotated and often includes discussion of related forms. In this connection *Nilaus minor ruwenzorii* (p. 698) from Mokia, Ruwenzori is described as new.

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[1] A Flightless New Zealand Bird. By Prof. Dayton Stoner. The Scientific Monthly pp. 182–184, XVII, No. 2. August, 1923.

[2] Notes on Spring Bird Migration of 1914 at Antigonish, N. S. By Harrison F. Lewis. Transactions Nova Scotian Inst. Science. XV, Part 2, pp. 119–128. June 30, 1923.

[3] Report on the Birds Collected During the British Museum Expedition to the Ivory Coast (French West Africa). By David A. Bannerman. With an Account of the Field Work. By Willoughby P. Lowe. The Ibis, October, 1923. pp. 667–748.

The paper is a valuable contribution to the bird life of a little known part of the African continent and the collector is to be congratulated upon making such a good collection under unusual difficulties, and the author upon working up the material so satisfactorily.—W. S.

Stuart Baker's 'Hand-List of the Birds of India.'—This work[1] consists of a reprint of the lists that have been appearing in the Journal of the Bombay Natural History Society, December, 1920 to April, 1923, repaged, with addenda covering seven pages. It presents a handy list of the birds of the Indian Empire, 2138 in number, including subspecies.

Technical and English names are given with the citation of original publication and type locality and a brief statement of range.

The author is now engaged upon his 'Avifauna of British India,' one volume of which has appeared, and the present list is to give working ornithologists a "rough catalogue showing what advance had already been made in distribution, nomenclature, etc., since Blanford's time" and to "fill the gap until the last volume of the 'Avifauna' appears." The list will prove exceedingly useful and we hope ornithologists will acceed to Mr. Stuart Baker's request and give him the benefit of any suggestions they may have tending to make the list more perfect.—W. S.

Birds in the Ecology of Spitsbergen and Bear Island.—The 29th paper[2] resulting from the Oxford University Expedition to Spitsbergen, 1921, deals with ecology. Birds are frequently mentioned and numerous notes on their food are given. The interesting conclusion is reached that birds contribute in an important way to maintenance of abundance and variety of life in the region, by bringing to the land as the residue of their marine food the principal supply of nitrogen upon which the plants subsist and which is therefore essential to the existence of various chains of organisms. Three species of Collembola, four of Terdigrades and one of diptera were found to live in the nest material of the birds and several species of bird lice live directly upon their hosts. All in all it is evident that birds play a very important part in the economy of the limited biota of these far northern lands.—W. L. M.

Economic Ornithology in Recent Entomological Publications.—The rather heterogeneous contributions to economic ornithology here noted are related only by occurrence in publications regarded as entomological.

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[1] A Hand-List of Genera and Species of Birds of the Indian Empire. By E. C. Stuart Baker. Reprinted from the Journal of the Bombay Natural History Society together with a Foreword and Addenda and Corrigenda prepared by the Author. Bombay [1923] pp. i–ix + 1–240. Price 6 Rupees (8 shillings net). Sold by Dulan & Co., 34–36 Margaret St., Cavendish Square, London.

[2] Sumner Hayes, U. S. and Elton, C. S. Journ. Ecol. 11, No. 2, Sept., 1923, pp. 214–286, pls. 2–4, figs. 1–7.

American silkworm (*Samia cecropia*).—In another[1] of his interesting papers on the natural control of insects Dr. John Tothill shows how this prolific moth with a caterpillar so large that, in numbers, it would be a great menace to woodlands, is so kept in check by natural enemies that only rarely does it actually become destructive. From observations of himself and others the author concludes that nearly three-fourths of the caterpillars are eaten by birds (Orioles, Robins, etc.) and about 85 per cent of the pupae are destroyed by Woodpeckers. The Hairy and Downy Woodpeckers are thought to be most prominent in this work.

Apple leaf skeletonizer (*Hemerophila pariana*).—This recently imported European pest has caused serious damage in Connecticut and New York. The caterpillar is of a type which our birds freely eat, and it is probable that eventually birds will rank high among the natural enemies of the insect. As a beginning in this direction the Chipping Sparrow has been observed feeding on the larvae.[2]

Mormon cricket (*Anabrus simplex*).—This well known pest of the western States developed an important outbreak in Colorado in the years 1918–1920 and in some localities did serious damage. Although a thorough study of its bird enemies was planned circumstances rendered this impracticable. However, a few observations are cited relating to Magpies, Blackbirds, and Sparrow Hawks, and the opinion given that "birds are among the most important factors in the control of these insects."[3]

Two injurious birds in Colorado.—W. L. Burnett thus brackets[4] the Ring-necked Pheasant and Piñon Jay. The faults of the former bird are digging out germinating seeds of corn, wheat, and oats and damaging sugar beets and garden vegetables. Little credit is given the bird for destruction of insects. This is a brief report of the investigation noted in a previous review ('The Auk,' 38, No. 3, July 1921, p. 480). The Piñon Jay feeds on corn in the field and in the shock and in some sections the losses have been heavy. This damage, as well as that to wheat by the same bird, have also been investigated by the Biological Survey and control measures recommended.

Bird enemies of cotton pests in the Virgin Islands.[5]—The Gray Kingbird (*Tyrannus dominicensis*) and the Black Witch or Judas Bird (*Crotophaga ani*) "eat large numbers of the larvae and adults and are of great value in controlling the cotton worm" (*Alabama argillacea*), the second most important pest of cotton in the islands. The same birds feed also on the fall army worm (*Laphygma frugiperda*), the southern green stinkbug

[1] Proc. Acadian Ent. Soc. 7. 1921 (June, 1922), pp. 30–36.

[2] Porter, B. A. and Garman, Philip, Bul. 246, Conn. Agr. Exp. Sta. Feb. 1923, p. 260.

[3] Corkins, C. L., 13th Ann. Rep. State Ent. Colo. (1921) June 1922, p. 54.

[4] 12th Ann. Rep. State Ent. Colo. (1920) June 1921, pp. 47–49.

[5] Wilson, Charles E. Bul. 3, Virgin Ids. Agr. Exp. Sta. May 1923, pp. 3, 5, 14, and 17.

(*Nezara viridula*), and the bollworm or corn earworm (*Heliothis obsoleta*), all injurious to cotton.

Bird enemies of Forest Insects.—Dr. E. P. Felt in his annual report for 1921[1] calls attention to the importance of birds as enemies of leaf-eating caterpillars in forests and suggests that "better protection of birds is one of the most promising methods of avoiding serious injury." After noting the complete destruction by English Sparrows of a flight of snow-white linden moths (*Ennomos subsignarius*) in the city of Albany, he further states: "Insect-feeding birds appear to be the most effective checks upon such outbreaks and occurrences such as noted above are additional arguments for the better protection of birds, since under present conditions, at least, the cost of artificial control in ordinary woodland areas would be prohibitive."—W. L. M

The Ornithological Journals

Bird-Lore.[2] XXV, No. 5. September–October, 1923.

Birds of Paradise at Little Tobago Island. By Henry D. Baker.—Interesting account of the habits of the birds and the proposal to catch them and transfer them to Miami, Fla.

The Bird-Feeding Towers of Ahmedabad [India]. By Grant Foreman.

The Marsh Hawk in Southern Michigan. By William G. Fargo.

Feeding-Habits of the Northern Shrike. By Ralph E. Danforth.

Observations on the Mockingbird at Dallas, Texas. By Alice B. Harrington.

The color plate depicts the Green Heron, American, Least and Cory's Bitterns.

Bird-Lore. XXV, No. 6. November–December, 1923.

Stories from Birdcraft Sanctuary. By Mabel Osgood Wright.

The Evening Grosbeak at Ithaca, N. Y. By Herbert Friedmann.

Our Winter Guests. By B. T. Chafin.

Great Blue Herons' Nests. By Donala Gillingham.—A remarkable photograph showing 27 nests and over 50 birds in one tree, at Vancouver, B. C.

Birds seen in Florida in February, 1923. By W. G. Fargo.

The colored plate, with migration and plumage notes, treats of Scott's and Audubon's Orioles and the number closes with the bulky report of the National Association of Audubon Societies which is full of important matter on bird study and the progress of conservation work.

The Condor.[3] XXV, No. 5. September–October, 1923.

An experiment with a Rufous Hummingbird. By A. Dawes DuBois.

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[1] 35th Rep. State Ent. N. Y. (1921) June 1923, pp. 82 and 84.

[2] D. Appleton and Co., Harrisburg, Pa.

[3] 514 Lester Ave., Pasadena, Calif.

More Notes from Saskatchewan. By H. H. Mitchell.—With photographs showing nesting site of Solitary Sandpiper in old Robin's nest.

Form of Egg and Extent of Migration. By Charles K. Averill.

Some Geographical Notes on the Cactus Wren. By Griffing Bancroft.

Description of a New Grouse from Southern California. By D. R. Dickey and A. J. van Rossem.—*Dendragapus obscurus howardi* (p. 168.)

List of Sea Birds Collected by Mr. Chas. Fagan. By Alexander Wetmore.—Between Panama and Valparaiso.

Notes on some Birds Observed in the Vicinity of Calusa, California. By Joseph Grinnell.

A note by Alan Brooks indicates that the alleged capture of *Mesophoyx intermedia* in British Columbia was based on a Japanese specimen.

The Wilson Bulletin.[1] XXXV, No. 3. September, 1923.

Birds of Calloway County, Kentucky. By Gordon Wilson.—Very briefly annotated list of 141 species.

A Review of the Records of the Trumpeter Swan in the state of Washington. By Walter P. Taylor.

Notes on the Bird Life of Allegheny County, Pennsylvania. By Thomas D. Burleigh (continued).

The Status of the Florida Crow. By Harold H. Bailey.—Mr. Bailey has five Florida and seven Common Crows but gives us no measurements for any of them, merely his opinion that as a result of comparison of alleged characters the birds are not separable.

The Oologist.[2] XL, No. 9. September, 1923.

Nesting of the Richardson Pigeon Hawk. By F. A. Patton.—In the Black Hills, S. D.

Nesting of the Mourning Warbler. By L. S. Dear.

The Ibis.[3] (11 Series) V, No. 4. October, 1923.

Bird Migration as Observed on the East Coast of England. By J. H. Gurney.—(1) The Autumnal Migration, (2) How far does wind affect Migration, (3) Observations made in Heligoland. This paper was written just prior to Mr. Gurney's death.

An Account of a Visit to the Breeding Islet of Sterna dougalli korustes and Sterna bergii edwardsi in Ceylon waters by Capt. W. W. A. Phillips.

On the Forms of Melierax. By H. Kirke Swann.

A Note on the Birds of Spiti. By Hugh Whistler.

On the Birds of South-east Yunnan, S. W. China. Part III. By J. D. LaTouche.

The Birds of Sind. Part VI. By Claud B. Ticehurst.

Report on the Birds collected during the British Museum Expedition to the Ivory Coast. By David A. Bannerman.—With an account of the

[1] Lynds Jones, Oberlin, Ohio.
[2] R. M. Barnes, Lacon, Ill.
[3] Wheldon & Wesley, Ltd., 2–4 Arthur St., New Oxford St., W. C. 2, London.

Field work by W. P. Lowe.—*Nilaus minor ruwenzorii* (p. 698) is described as new from Ruwenzori.

British Birds.[1] XVII, No. 5. October, 1923.

Field Notes from Glamorganshire. By Geoffrey C. S. Ingram and H. M. Salmon.

Some Observations on Cuckoos in 1923. By Edgar Chance.—The same paper appears as a letter in the October 'Ibis'.

First Impressions of Some Birds seen on the Naardermeer. By Edward A. Armstrong.

The Name of the Scottish Ptamigan. By Ernst Hartert.—*L. cinereus* Magillivray being proven untenable he names it *L. mutus millaisi* (p. 106).

On the Red Grouse from Ireland and the Outer Hebrides. By H. F. Witherby.—Not distinguishable from one another but different from the British form so that they may be known as *Tetrao scoticus hibernicus* (Kleinschmidt).

On the Names Proposed by Rennie in Montague's Ornithological Dictionary. By F. C. R. Jourdain.

A most interesting note by Mr. Serle describes Mr. David Hamilton's studies of nesting Swifts; both male and female were found sitting side by side on the nest.

British Birds. XVII, No. 4. September, 1923.

A Note on the Nesting of the Whimbrel. By William E. Glegg.—With excellent photographs.

British Birds. XVII, No. 6. November, 1923.

Pigeons and Pigeon-Racing. By B. B. Riviere.—This is a very important paper to those interested in the problem of bird migration. As the author says, it is surprising "how ittle most ornithologists seem to know about the work of Homing Pigeons," and he proceeds to set forth the more important points in Pigeon racing and the results obtained as well as his theory as to how Pigeons reach home on long flights. His theory is briefly as follows: that they "find their way home by means of remarkable powers of vision and observation, combined with a wonderfully retentave memory for the configuration of any country which they have once flown over." They also learn that they must steer in one particular course (individual pigeons being always trained over a single course) and have an instinctive sense of geographical direction or consciousness of the points of the compass. This power of picking out their customary direction of flight he regards as very different from "homing by instinct" but it does not strike the reviewer that there is much difference. It must be remembered that Mr. Riviere's conclusions are based almost exclusively upon experience with Pigeons trained over definite courses. He makes no reference to the reports of the French Pigeon service (*cf.* Bird Lore, II, p. 101)

[1] H. F. & G. Witherby, 326 High Holborn, London.

in which it is claimed that birds taken in closed baskets over an irregular route returned the same way instead of in a straight line, nor to Dr. Watson's Terns at the Dry Tortugas. He also mentions instances of untrained Pigeons homing successfully but regards these as "flukes."

Unfortunately we have no series of flights of absolutely untrained Pigeons with which to compare the flights of trained birds, as such experiments would prove costly and useless for racing purposes.

However the data presented are of the greatest importance especially those which relate to over sea flights and the lack of hesitation on the part of the birds in attempting them.

The Oologist. XL, No. 10. October, 1923.

Notes from the Ozark Mountains. By Johnson Neff.

Bulletin of the British Ornithologists' Club.[1] CCLXXXI. November 5, 1923.

Mr. David Bannerman describes four new birds collected in northern Cameroon by G. L. Bates, and Dr. Hartert two from Tanganyika. Mr. Stuart Baker discusses oriental Muscicapidae, Laniidae and Pericrocotidae, listing the species of certain genera and describing new forms of *Culicicapa* and *Lalage*.

Messrs. Robinson and Kloss describe a new *Aethopyga* and Col. Meinertzhagen two Larks.

Dr. G. C. Low discusses the species and nomenclature of Oystercatchers

Avicultural Magazine.[2] (IV Series) I, Nos. 8, 9 and 10. August, September and October, 1923.

A Possible Curtailment of Aviculture. By Allen Silver.—Rumor of a possible bill in Parliament and a discussion of the merits of bird keeping. The most likely curtailment is action by Australia and other countries similar to that in the United States stopping the catching or export of their native birds (August).

The Game-birds and Pigeons of the Gambia. By Dr. E. Hopkinson. (August–October.)

The Romance of a Tropical Forest. By J. B. Housten (August and September).—A romance indeed since he finds flocks of California Vultures feeding with the Turkey Buzzards at San Antonio, Tex., and Magnolia and Bay-breasted Warblers breeding there!

The Oologist's Record.[3] III, No. 3. September, 1923.

This admirable magazine, which aims to treat the study of eggs as a branch of scientific ornithology contains an important paper on the eggs of palaearctic Accipitres by Rev. F. C. R. Jourdain and several communications on proposed legislation for the protection of British birds.

[1] Dr. Percy R. Lowe, Nat. Hist. Museum, S. Kensington, London.
[2] Stephen Austin & Sons, 5 Ford St., Hertford, England.
[3] Harrison & Sons, Ltd., 45 St. Martin's Lane, London, W. C. 2.

The Emu.[1] XXIII, Part 2. October, 1923.

The Long-Lost Eyrean Grass Wren. By A. J. Campbell.—Two specimens in the British Museum collected in 1875 are the only ones known. An excellent colored plate of the bird (*Amytornis goyderi*) illustrates the article.

A Week on the Upper Barcoo, Central Queensland. By W. B. Alexander.

Australian Petrel Forms: Still More to Learn. By T. Iredale.—As observed from the vessel on a voyage from England to Australia.

The Gannets of Cape Kidnappers. By H. S. Cottrell.

How Settlement and Other Factors are Affecting Native Birds. By A. S. LeSoueff.

Notes on Honeyeaters. By P. A. Gilbert.

The Fijian Crimson-Breasted Parrot. By Casey A. Wood.

The Crested Bell-Bird. By Amy Baesjon.

Birds of the Broome Hill District. By Tom Carter.

Revue Francaise d'Ornithologie.[2] XV, Nos. 172–173. August–September, 1923. [In French.]

An Examination of Nidification of Hole-nesting Birds through the Oriface. By Dr. F. Cathelin.—By means of a minute electric bulb and a mirror.

Description of a New Subspecies of *Alauda arvensis*. By A. Vaucher.—*A. a. henrii* (p. 155) coast of Tetnan and probably southern Spain.

Study of a Collection of Birds from Mexico. By J. Berlioz (continued).

The Eider in Brittany. By H. de Balsac.

Ornithological trips to the Region North of the Sahara. By H. de Balsac. (continued in October.)

The Migration of Birds. By G. de Burg.—Discussion of European Routes. (continued in October.)

Der Ornithologische Beobachter.[3] XX, No. 12. September, 1923. [In German and French.]

The Hoopoe in the Bernese Seeland. By H. Mühlemann.—With photographs from life.

Ornithologische Monatsberichte.[4] XXXI, No. 6. November–December, 1923. [In German.]

On the Speech of Parrots and their Intellectual Ability. By F. von Lucanus.

Accipiter leucosomus (Sharpe). An Albinistic Mutant of *Accipiter elorques* (Salv.). By E. Stresemann.

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[1] 2 Temple Court, Melbourne, Australia.
[2] 5 Rue de Stockholm, Paris (8e), France.
[3] R. G. Zbinden & C. Basel, Switzerland.
[4] R. Friedlander & Sohn, Berlin N. W. 6, Karlstr. 11, Germany.

Journal für Ornithologie.[1] 71, Part 4. October, 1923. [In German.]

On the Floristic-Faunistic Associations of South China with especial consideration of the Avifauna. By R. Mell.

Remarks on Some Persian Birds III. By N. Sarudny and M. Harms.

The Acquirement of Crests by Canary-birds. By H. Duncker.

On the Drawing of *Leguatia gigantea* of Francis Barlow. By E. Stresemann.

On the Influence of Climatic Factors on the Pigmentation of Bird Feathers. By K. Görnitz.

Mutation Studies. By E. Stresemann.

On Some Accipiter species. By E. Stresemann who also describes *Baza lophotes melli* (p. 525) Tso-gok-wahn, China.

Ornithological Articles in Other Journals.

Bailey, Vernon. Maximilian's Travels in the Interior of North America, 1832 to 1834 (Natural History, XXIII, No. 4).—Some account of his bird collection now in the American Museum.

Cahn, Alvin R. Louisiana Herons and Reddish Egrets at Home. (Natural History, XXIII, No. 5.)—A visit to Green Island off the Texas coast; beautifully illustrated.

Lloyd, Hoyes. The Birds of Ottawa, 1923 (continued in October). (Canadian Field Naturalist, September, 1923).

Munro, J. A. A Preliminary Report on the Relationship of Various Ducks and Gulls to the Propagation of Sock-eye Salmon. (Ibid.)—At Henderson Lake, B. C., Mergansers, Barrow's Golden-eyes, Glaucous-winged and Short-billed Gulls were feeding on Salmon spawn to an extent damaging to fishing industries.

Pearse, Theed. Banding Glaucous-winged Gulls. (Ibid.) October 1923.—With other notes on a colony in British Columbia.

Saunders, W. E. The Mockingbird in Ontario. (Ibid.)

Stoddard, H. L. July Bird Notes from Bonaventure Island, Quebec. (Ibid.)

Stewart, Walter. The Rook in Lanarkshire (Scottish Naturalist, September–October, 1923).—With a map of Rookeries.

Evans, William. The Eider Duck (*Somateria mollissima*) in the "Forth Area." (Ibid.)

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CORRESPONDENCE

Fisher on 'Scientific Collecting.'

Editor of 'THE AUK':

The ornithologists of the country and the fish, game and conservation commissioners are alike indebted to Dr. A. K. Fisher of the United States Bureau of Biological Survey for his 'Statement Regarding Scientific Collecting,' which appeared in the July issue of the 'Bulletin of the American Game Protective and Propagation Association.' This statement has gone far to clear up many misunderstandings, and should encourage every commissioner throughout the United States to take a liberal attitude in the encouragement of scientific research.

Dr. Fisher is correct in every particular when he states that no program of conservation will be of value or enduring unless it is founded on scientific research. We who are actively in the work have seen this time and time again. It stands to reason that unless we know the habits of a given species, the diseases to which it is susceptible, the mating periods, the proper environment for both breeding grounds and rearing grounds, together with some check on the increase or decrease, we cannot intelligently proceed.

Very few of the states have highly trained biologists in active connection with the work. Very few have the same facilities for study and observation as are supplied by the ornithologists of the country. Certainly there is no other source of information as complete as that offered by the Bureau of Biological Survey, the great museums of the country, and such organizations as the American Ornithologists' Union, the Nuttall Ornithological Club, etc.

If there is any criticism of the activities of the ornithologists up to the present time, it should be along the lines that they have failed through their organizations to be of as much practical assistance to the commissioners throughout the country as they might be were their activities given more publicity, and were a part of their researches directed along certain practical lines in conformity with a program laid out to cover a period of years.

It is a well known fact, for example, that the Ruffed Grouse go through a cycle which ranges from a period of great scarcity to one of reasonable abundance. The real cause of this is today unknown. You can obtain

almost as many theories as to why it occurs as there are ornithologists and commissioners. When it comes down to fundamentals, we do not know.

If the ornithologists could so completely organize and lay a program of research which would extend over a period of years, taking up certain problems such as the life cycle of the Ruffed Grouse, the recurrence of certain diseases, such as those which affect the Quail from time to time, together with some of the problems of artificial propagation of our game birds, the commissioners would derive some direct and specific assistance in carrying on their work. A good case in point is the activities of the American Fisheries Society. In addition to the scientific research of a rather highly specialized character, the members of this society are also conducting investigations into the feeding of fish and the control of fish diseases. At the recent meeting in St. Louis, a substantial portion of the three days' program was devoted entirely to a discussion of these two propositions. The results were of immediate benefit to all of us who are grappling with these problems every day. If the ornithologists of the country could, as part of their program of research, have a division devoted to such investigations as indicated above so that annually the commissioners could have a contribution which would be of immediate help, it would go a long way toward removing any misunderstandings which today exist. It is something of a surprise to us in Massachusetts that Dr. Fisher intimates antagonism by certain commissioners and the sportsmen in certain states to the activities of scientific collectors, for the reason that no such opposition exists in this state, either in the Conservation Department or in the minds of the sportsmen. At any rate such an attitude by the sportsmen has never been manifested. Several years ago I called together the ornithologists of the country, in so far as they could come to Boston, for a conference on what should be the policy of our Department in the matter of issuing permits to take birds and eggs for scientific purposes. About sixty men attended. They ranged in ages from men still in college to white-bearded men in the seventies. I asked that every man in the room stand up who was interested in bird collecting before he reached the age of ten years and every man in the room stood. Certain interesting facts came out in the discussion, embodied in the conclusion that a state should be liberal in issuing these permits, that there were not enough younger men turning to these fields to keep up the work already started. That if young men and women were to be encouraged they should have the opportunity to start young. That they should be stimulated by being permitted to collect their own material. That this part of the work was most valuable in getting them outdoors and in close touch with the elementary steps in scientific collecting and observing. That the mere study of specimens already preserved was not sufficient. It was even stated by one member that one of the largest educational institutions of the country had delayed in sending out certain scientific expeditions for the

reason that no young men were available who had had the necessary training. It was agreed that permits were not to be handed out indifferently to all youngsters who applied for them, but only in those cases where a real interest was shown, and then with the provision that the apprentices would work under the direction of some recognized ornithologist. This would not only be to the student's advantage, but would be a safeguard against any injudicious acts. These conclusions have been our guide in Massachusetts. We have issued a number of permits under the arrangement that the student would work with some recognized collector who would vouch for him. Our scientific institutions are encouraged to come to us with their problems. Not with the idea that we can supply highly trained men to work out a solution, but that we may do all in our power to assist scientists in their investigations.

The conservation commissioners throughout the country to a man should be squarely behind the ornithologists to help them in every possible way to carry on their investigations. Dr. Fisher has made it perfectly plain that the number of specimens taken is only a drop in the bucket compared to the losses to our wild life resulting from other causes. We should not lose sight of the fact that those specimens taken for science are not lost. They do not go down the gullet, but into the brain, and eventually we are all rewarded by growing contributions to that fund of exact knowledge on which the hopes of our work must be based. The ornithologists in return must conduct a portion of their researches along lines which will help in every-day problems. This teamwork exists today in our state. It should exist in every state in the Union. WILLIAM C. ADAMS, *Director, Div. of Fisheries and Game, Mass. Dept. Conservation.*

NOTES AND NEWS.

IN the present Congress the Federal Public Shooting Ground and Game Refuge Bill which was defeated by a few votes in the last Congress, will be reintroduced. The Secretary of Agriculture, the American Game Protective Association and all true sportsmen have endorsed it and members of the A. O. U. should use their influence with their representatives to secure its passage.

Judge Lee Miles explains its provisions in the November issue of 'American Forestry' and Mr. Ray P. Holland in the October number of the 'Bulletin of the American Game Protection Association.'

Briefly the purpose is to establish a federal license fee of one dollar on hunters of migratory game birds, the funds so secured to be devoted (1) to the purchase or rental of areas of water and marsh land to prevent their destruction by drainage and to make them perpetual public shooting grounds in the open season and protected game refuges at other times, and (2) to the enforcement of the provision of the migratory bird treaty.

This will place the expense of game maintenance squarely upon the hunters who enjoy the benefits and relieve the government of a considerable outlay, while it will maintain splendid game refuges and offer opportunities to check the widespread drainage operations which have worked such havoc among water fowl in the west and are driving them away everywhere. All interested in wild life conservation should act at once to ensure the passage of this bill.

THERE is unfortunately much disagreement among experts as to methods of protecting wild life, some preaching extermination of so called pests, others opposing such a violent upset of Nature's balance. Personally we hold the latter view and would advocate the killing of individual birds of a species when damaging crops or wild fowl, but not the extermination of the species. The latter may involve factors that we know nothing whatever about at the moment and once accomplished can never be rectified.

In this connection we call attention to the curiously involved case of the Crow, against which widespread propaganda are now being carried on in the daily papers and some sportsmen's journals. A recent issue of the 'Game and Fish Conservationist' throws much light on this subject. We read here an illustrated account giving the experiences of Dr. B. H. Warren with Crows on the Virginia coast islands where by the aid of photographs great quantities of Gull and Mudhen eggs are shown under trees where Crows nest. We know that thousands of these eggs are washed out on the meadows by high tides but to what extent these eggs furnished the Crows supply we have no data. The interesting fact however is that while this article (widely circulated) is an attack on the Crow, the bird that did this damage is quite another species, the Fish Crow, an important detail which is not referred to! Furthermore a prefactory note states that a leading gun-powder company financed Dr. Warren's trip, and that the sales-manager of the company states that Crows are increasing of late years.

Most ornithologists will differ on this latter statement while the publications of the U. S. Dept. of Agriculture (Biological Survey) show that the Common Crow does about as much good as harm. By all means let the farmer kill Crows when damaging crops but do not let us *exterminate* an extremely interesting species of bird on the advice of ammunition manufacturers.

We find the same thing in connection with certain Hawks, the shooting of which as "vermin" is widely encouraged and uses up a great deal of ammunition. The stopping of shooting of shore birds and Flickers forces those who have to shoot something to kill Hawks and at strategic points like Cape May, N. J., thousands of Sharp-shinned, Cooper's and Pigeon Hawks and many Sparrow and Marsh Hawks are killed every autumn.

And now propaganda are started against the Red-Squirrel.

These birds and animals have always had precisely the same habits and killed just as many birds and destroyed just as many eggs as they do today.

It is all part of Nature's scheme and when we begin to upset it who knows what the result will be? At any rate the facts set forth are food for thought.

LEWIS DEXTER, an associate of The American Ornithologists' Union since 1915, died in Boston, Mass. on August 19, 1923. He was born in Providence, R. I. March 28, 1860, and after receiving the degree of A. B. from Brown University in 1883, he entered the cotton business, an industry with which he was associated until a few months before his death. For twenty years after leaving college he held a position in the St. Croix Mills at Milltown, New Brunswick, and later, for many years he was Manager at the Stark Mills at Manchester, N. H. until, following a period of reorganization and labor difficulty, his health began to fail and, after a prolonged rest in Florida, he assumed duties more within the compass of his strength at the Warner Mill at Newburyport, Mass. This position, however, proved too great a tax on his strength and in January 1923, he retired to the country at Andover, N. H. where for a few months he lived a life of quiet. He died suddenly at The Phillips House, a Boston Hospital, leaving behind his widow and three married daughters.

Mr. Dexter's interest in birds began when he was living in New Brunswick. He was at first a sportsman and hunter, but his interest was soon directed to the study of the distribution and habits of birds, and in his later years it included the literature of ornithology. Discoveries of problematical birds in Manchester were sure to be reported to him for solution, and bird-lovers often appealed to him for advice and help. On the infrequent occasions when he came to Cambridge to attend a meeting of the Nuttall Ornithological Club, he always gave pleasure to the members present by expressing the enjoyment he felt in spending the evening with friends whom he was seldom able to meet. His friendship with Walter Faxon, whom he met about ten years ago, was a great stimulus to Mr. Dexter's study of ornithology, and I believe that there were few happier days in his life than during the two excursions when he and Mr. Faxon toured the White Mountains together.

His family and those associated with Mr. Dexter during the years immediately after the war, realized that the strain of the responsibility he had carried and the solicitude he had felt for the men in his charge had made a permanent effect on him,—that these cares had taken strength away which he would never regain,— but they looked forward to years of comfortable, happy lifetime for him, as Mr. Dexter did himself, in which, undisturbed by cares of business, he could follow his chosen avocation.

It is sad that this could not be. With Mr. Dexter, as with many men, the study of birds had to be reserved for the spare hours in a very busy life; it is sad that when leisure came, he did not live to devote himself to the science that he loved.—W. M. T.

THE NUTTALL ORNITHOLOGICAL CLUB, on December 7, 1923, celebrated its fiftieth anniversary by a special afternoon meeting at Cambridge,

under the hospitable roof of Mr. Charles F. Batchelder, its senior resident member. By invitation, two ex-presidents of the A. O. U., Dr. Witmer Stone, of the Academy of Natural Sciences of Philadelphia, and Mr. John. H. Sage, of Portland, Conn., were present as honored guests. Dr. Stone conveyed to the Club a cordial greeting from the Delaware Valley Ornithological Club and gave a brilliant address on the development of the science of ornithology in this country and the opportunities for broadening its scope. He brought out the influence of such men as William Brewster, Elliott Coues, J. A. Allen, and other early members of the Nuttall Club, on the growth of ornithology. At the close of this address, formal announcement was made of the election to Honorary Membership in the Club, of Henry W. Henshaw, one of its founders, John H. Sage, and Dr. Witmer Stone. The meeting then adjourned to a dinner at the Tavern Club, Boston. Messages were read from Henry W. Henshaw, Walter Woodman, and Ruthven Deane, three of the five founders of the Club now living; and reminiscences of its earlier days were given by Ernest Ingersoll, another living founder. Other speakers were: Dr. Charles W. Townsend, John Murdoch, Dr. Witmer Stone, and Thomas E. Penard. The Club presented to Charles F. Batchelder a silver punchbowl in appreciation of his long and valued services as Treasurer, Editor and Councillor. Altogether the occasion was a memorable one, recalling the notable part played by Cambridge men in ornithological history.—G. M. A.

The Annual Meeting of the Inland Bird Banding Association was held in Indianapolis, Indiana, on November 2 and 3, 1923, under the auspices of the Indiana Audubon Society, and the Nature Study Club of Indiana. A two days scientific program was arranged, the papers relating chiefly to Bird Banding, and illustrated by lantern slides. The meetings proved very popular, and were well attended and most satisfactory to all three organizations.

On Friday afternoon the business session of the Inland Association was held, and the following officers elected:

S. Prentiss Baldwin, President, Williamson Bldg., Cleveland, O.; Dr. Leon J. Cole, Vice President, University of Wisconsin, Madison, Wis.; Wm. I. Lyon, Secretary, 124 Washington St., Waukegan, Ill.; Herbert L. Stoddard, Treasurer, Public Museum, Milwaukee, Wis.

Councillors: M. J. Magee, Sault Ste. Marie, Mich.; Mrs. H. C. Miller, Racine, Wis.; Dr. H. B. Ward, University of Illinois; Albert F. Ganier, Nashville, Tenn.; P. B. Coffin, Chicago, Ill.; Dr. F. C. Test, Chicago, Ill.; Samuel E. Perkins, III, Indianapolis, Ind.; Prof. J. M. Robinson, Auburn, Ala.

On Friday evening, Mr. Richard Lieber, Director of Conservation for the State of Indiana gave an interesting talk on 'Conservation of Bird Life in the State Parks' and Mr. Baldwin, President of the Inland Association, talked on 'The Methods of Trapping and Banding Wild Birds and Interesting Stories Derived from this Method,' illustrating his remarks with lantern slides.

On Saturday morning the program was as follows: Mr. W. S. Blatchley, 'A Naturalist in South America;' Mr. Wm. I. Lyon, Secy. of the Inland Bird Banding Association, 'Scientific Methods and Results in Banding Wild Birds,' illustrated by slides; Mr. Frederick C. Lincoln, U. S. Biological Survey, 'Bird Banding Under the U. S. Biological Survey."

In the afternoon, Mr. Herbert L. Stoddard, Treasurer, Inland Bird Banding Association, 'The Shore Birds of Lake Michigan,' illustrated by lantern slides; Mr. T. E. Musselman, Field Secretary, Inland Bird Banding Association, 'Bird Banding at Thomasville, Georgia—Handling 4,000 Birds in 40 Days,' illustrated by lantern slides and Mr. S. Prentiss Baldwin, 'Bird Banding as Used in the Intensive Study of One Species of Birds.'

This was followed by the Annual Dinner attended by members of the three organizations, Dr. Stanley Coulter, Dean of Purdue University, presiding. An address by Dr. Amos W. Butler, with informal talks by Percival B. Coffin, Mrs. H. C. Miller, O. M. Schantz, A. H. Hadley, Prof. C. H. Eigenmann and others.

The reports of progress of the Inland Association besides the success in publicity and membership brought out some very interesting activities of the Association which promise much for the future. The Cleveland Museum of Natural History has organized and recently sent into the South Atlantic a two years collecting expedition headed by George Finlay Simmons. The Inland Association in cooperation with the U. S. Biological Survey provided a large supply of bands, which will be put upon the birds of the South Atlantic. While it is recognized that the percentage of "returns" from this work will be small, yet any "return" is certain to be of very great interest.

AN INTERESTING announcement made at the meeting of the American Ornithologists' Union at Cambridge was that in regard to plans for a complete study of the life history of the Quail: a bird which has been less thoroughly studied perhaps than our other American game birds.

The present plan is an outgrowth of the trapping and banding station, maintained by S. Prentiss Baldwin at Thomasville, Georgia, during the last ten years.

It seems that some two hundred thousand acres, between Thomasville, Georgia and Tallahassee, Florida, are taken up by sportsmen for Quail shooting. The sportsmen are chiefly men from New York or from Cleveland, and mostly own the Quail lands in large areas of ten to fifteen thousand acres; or in some cases the Quail lands are leased; the lands are cultivated by tenant farmers as cultivation is better for the Quail shooting sport. The interest in Mr. Baldwin's trapping and banding at Thomasville has created some talk for several years as to the practical question of placing bands upon Quail coveys, and then by keeping track of the birds as shot, some information would be obtained of the extent to which Quail wander or scatter.

During the last winter several of the Quail sportsmen gathered at the home of Mr. Lapsley near Tallahassee, Florida, to discuss the proposition to have a thorough study made of the Quail, its life history, breeding, foods, diseases, natural enemies and any other questions bearing upon it; this to include the study by banding of the extent of wandering or scattering of Quail. A meeting in New York on April 25, 1923, was attended by Messrs. Chas. M. Chapin, L. S. Thompson, Arthur Lapsley, Percy Chubb, Robt. H. McCurdy, Russell Perkins, John T. Nichols of the American Museum of Natural History, Frederick C. Lincoln, of the U. S. Biological Survey, and S. Prentiss Baldwin, President of the Inland Bird Banding Association. At this meeting it was definitely decided to raise funds for such an investigation; to arrange with the U. S. Biological Survey a plan for the Survey to take charge of the scientific work, and plan to employ an ornithologist and assistant to proceed to Thomasville at once to carry out such a study. A Committee of Quail sportsmen was formed, with L. S. Thompson, Redbank, N. J., Chairman, and Arthur Lapsley, Promfret Centre, Connecticut, as Secretary and this Committee has reported funds, sufficient to provide for the work to be carried on for at least three years. The work will be entirely in charge of the U. S. Biological Survey, and any application from one who may wish to be employed in this work should be made to Dr. E. W. Nelson, Chief, U. S. Biological Survey, Washington.

Suggestions, questions and information may be sent to Dr. E. W. Nelson, U. S. Biological Survey or to S. Prentiss Baldwin, President Inland Bird Banding Association, 817 Williamson Bldg., Cleveland, O.

Under the auspices of the New England Bird Banding Association and with the official endorsements of the Nuttall Ornithological Club, the Essex County Ornithological Club, and others organizations, a course of ten lectures on 'The Elements of Ornithology' will be given by Dr. Glover M. Allen in January, February, and March, 1924, in the lecture-room of the Boston Society of Natural History. The lectures will treat the subject somewhat thoroughly, discussing structure, classification, habits, migration, plumage, song, etc., and will be illustrated by lantern slides and study material. In addition to their oral delivery they will be printed and sent to subscribers as a correspondence course. The prices will be $5.00 for attendance at the course, $.75 for single lectures, and $3.00 for the correspondence course. Persons taking the course in either form will be expected to take a written examination at the end.

The purpose of the New England Bird Banding Association in arranging this course is not only to provide a means of personal pleasure and profit for its members and other bird students, but also to help the science of ornithology itself by awakening an interest on the part of bird-banders and others in the many ornithological problems which are waiting to be solved. The Association is fortunate in receiving the services of so competent an ornithologist as Dr. Allen.

It is understood that after the completion of Dr. Allen's course a supplementary lecture will be given by Prof. Alfred O. Gross for the purpose of indicating to bird-banders and other students how they can best assist in cooperative work.

Further information in regard to the lectures will be furnished on application to Lawrence B. Fletcher, Secretary, Room 941, 50 Congress St., Boston.

MEMBERS of the Union will be interested to learn that no casualties were reported among the ornithologists of Tokyo in the great earthquake and fire which devastated the city September 1, 1923. Under date of October 23 our Honorary Fellow Nagamichi Kuroda writes: "My house was very near the area of destruction in Tokyo, but I was fortunate enough to escape from both earthquake and fire. My own ornithological collection was also safe. Mr. S. Uchida and other ornithologists escaped the disaster except that Mr. T. Momiyama's collection of birds (about 2000 skins from Japan and Micronesia) was lost. The Tokyo Educational Museum at Ochanomizu in Tokyo was lost but the Imperial Museum at Uyeno Park and the Science College, Tokyo Imperial University were saved."

COMPLETE SETS OF 'THE AUK.'—Since the publication of the list of about 150 sets of the journal ('Auk,' Apr. 1920, pp. 348–352), several notes have appeared from time to time calling attention to additions or to changes of ownership. Much activity in completing sets has been manifested during the last three years and in spite of changes due to the death of some of the owners the number of sets has steadily increased. The list corrected to January 1, 1924 is now published in full, arranged geographically as before with the sets in public libraries mentioned first, followed by those in private hands. An asterisk indicates that a single volume or part of a volume is missing

A complete set of 'The Auk' includes 40 volumes and the two general indexes for 1876–1900 and 1901–1910. The total number now known is 203 of which only 87 are in public libraries or museums. The Secretary requests any information concerning additions or corrections which will increase the accuracy of the list. He will also be glad to advise members who are interested in obtaining back numbers to complete their sets.

ALABAMA

Dept. Archives & History, Montgomery

ARIZONA

University of Arizona, Tucson

CALIFORNIA—20

California Academy of Sciences, San Francisco

Leland Stanford Jr. University, Palo Alto

Museum of History, Science and Art, Los Angeles
University of California, Berkeley
Scripps Biol. Station, La Jolla
Chambers, W. Lee, Eagle Rock, Los Angeles
Dawson, W. L., Santa Barbara
Dickey, D. R., Pasadena
*Emerson, W. O., Haywards
Evermann, Dr. B. W., San Francisco
Fisher, Prof. W. K., Pacific Grove (Bendire set)
Fowler, F. H., Palo Alto
Grinnell, Dr. Joseph, Berkeley
Hoffmann, R. W., Carpenteria
Howell, A. B., Pasadena
Ingersoll, A. M., San Diego
Mailliard, Joseph, San Francisco
Morcom, G. Frean, Berkeley
Stephens, Frank, San Diego
Storer, T. I., Davis

COLORADO

Coburn Library, Colorado College, Colorado Springs
Bergtold, Dr. W. H., Denver
* Mitchell, Dr. W. I., Paonia

CONNECTICUT—7

Pequot Library, Southport
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Bishop, Dr. Louis B., New Haven
Ferguson, H. L., Greenwich (Allen set)
Sage, John Hall, Portland
Seton, Ernest T., Greenwich

DISTRICT OF COLUMBIA—21

Library of Congress, Washington
U. S. Dept. Agriculture, Wash.
U. S. National Museum, Wash. (2)
Bailey, Mrs. Vernon, Washington
Bartsch, Dr. Paul, Washington
Bond, Frank, Washington
Cooke, Miss M. T., Washington
Fisher, Dr. A. K., Washington
Hollister, Ned, Washington
Howell, A. H., Washington
Nelson, Dr. E. W., Washington
Oberholser, Dr. H. C., Washington
Palmer, Dr. T. S., Washington
Richmond, Dr. Chas. W., Wash.
Riley, Joseph H., Washington
Smith, Dr. H. M., Washington
* Stejneger, Dr. Leonhard, Wash.
Swales, B. H., Washington
Wetmore, Dr. Alexander, Wash. (Mearns set)
Williams, R. W., Washington (McIlwraith set)

FLORIDA

Bailey, H. H., Miami
Nehrling, H., Naples on the Gulf

ILLINOIS—11

Field Museum, Chicago
Illinois State Laboratory of Natural History, Urbana
John Crerar Library, Chicago
Public Library, Chicago
University of Chicago, Chicago
Barnes, R. Magoon, Lacon
Coale, Henry K., Highland Park
Conover, H. B., Chicago (Osgood set)

Deane, Ruthven, Chicago
Gault, B. T., Chicago
Ridgway, Robert, Olney

INDIANA

Indiana State Library, Indianapolis
Butler, Amos W., Indianapolis
Indiana Univ. Library, Bloomington

IOWA

Iowa State College, Ames
Stephens, Prof. T. C., Sioux City

KANSAS

State Library, Topeka
*Bunker, C. D., Lawrence

MAINE—5

Bowdoin College, Brunswick (F. H. Knowlton set)
Public Library, Portland
Johnson, H. H., Pittsfield
Merrill, Harry, Bangor
Norton, Arthur H., Portland

MARYLAND

Enoch Pratt Free Library, Baltimore
Jackson, R. W., Cambridge
Kirkwood, Frank C., Monkton

MASSACHUSETTS—25

Boston Public Library
Boston Society of Natural History
Fall River Public Library (Durfee set)
Mass. Agricultural College, Amherst
Mass. Audubon Society, Boston (Purdie set)
Mass. State Library, Boston
Museum Comparative Zoology, Cambridge
New Bedford Public Library
Springfield Library Association
*Taunton Public Library
Thayer Museum, Lancaster
Wellesley College, Wellesley
Bagg, A. C., Holyoke
Batchelder, Charles F., Cambridge
Bent, A. C., Taunton
Chamberlain, Chauncy W., Boston
Farley, John A., Malden
Fletcher, L. B., Brookline (Merriam set)
Jeffries, William D., Boston
Kennard, F. H., Newton Centre
Lawson, Ralph, Salem (W. H. Fox set)
Morris, Robert O., Springfield
Phillips, Dr. John C., Wenham
Townsend, Dr. Charles W., Boston
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MICHIGAN

Detroit Public Library
Grand Rapids Public Library
Mich. Agricultural College, East Lansing
Wood, Norman A., Ann Arbor

MINNESOTA

Minnesota Athenaeum Library, Minneapolis
Roberts, Dr. Thomas S., Minneapolis

MISSOURI

Bolt, Benjamin F., Kansas City
Harris, Harry, Kansas City
Widmann, Otto, St. Louis

NEBRASKA

University of Nebraska, Lincoln
Dille, Frederick M., Valentine

NEW HAMPSHIRE

Levey, Mrs. William M., Alton Bay
White, Francis Beach, Concord
Whittle, Mrs. H. G., Peterboro

NEW JERSEY

Princeton University, Princeton
Bowdish, B. S., Demarest
Havemeyer, H. O., Mahwah
Rhoads, Samuel N., Haddonfield

NEW YORK—24

American Museum Natural History, New York
Brooklyn Museum
Brooklyn Public Library
Buffalo Public Library
Columbia University, New York
Cornell University, Ithaca
Nat. Association Audubon Societies, New York
New York Public Library
N. Y. State College of Forestry, Syracuse
New York State Library, Albany
New York Zoological Soc., New York
Vassar College, Poughkeepsie
Braislin, Dr. Wm. C., Brooklyn
Chapman, Dr. Frank M., New York
Crosby, M. S., Rhinebeck
Dwight, Dr. Jonathan, New York
*Fuertes, L. A., Ithaca
Grinnell, Dr. Geo. Bird, New York
Herrick, Harold, New York
Pangburn, C. H., New York (W. C. Metcalfe set)
Pearson, T. Gilbert, New York
Philipp, P. B., New York
Williams, R. S., New York
Woodruff, L. B., New York

OHIO—7

Adelbert College, Cleveland
Cincinnati Public Library
Cincinnati Society Natural History
Cleveland Museum, Cleveland (J. L. Childs set)
Oberlin College, Oberlin
Ohio State University, Columbus
Baldwin, S. P., Cleveland (Leverkuhn set)

OKLAHOMA

*Hallinen, J. E., Cooperton
Nice, Mrs. M. M., Norman (Henshaw set)

PENNSYLVANIA—8

Academy Natural Sciences, Philadelphia
Carnegie Library, Pittsburgh
Carnegie Museum, Pittsburgh (Todd set)
Burns, Frank L., Berwyn
Fisher, Miss Elizabeth W., Philadelphia
Norris, J. Parker, Jr., Philadelphia
Stone, Dr. Witmer, Philadelphia(2)

RHODE ISLAND

Hathaway, Harry S., Providence

SOUTH CAROLINA

Charleston Museum, Charleston (Brewster set)
Wayne, Arthur T., Mt. Pleasant

TEXAS

University of Texas, Austin

WASHINGTON

*Public Library, Seattle
Rathbun, Samuel F., Seattle

WISCONSIN

Milwaukee Public Museum
Taylor, Warner, Madison (special Allen set)

PHILIPPINE ISLANDS

Bureau of Science, Manila

PORTO RICO

Dexter, J. S., Santurce

CANADA—14

Geological Survey, Ottawa
Laval University, Quebec
McGill University, Montreal
Reference Library, Toronto
University of Manitoba, Winnipeg
Arnold, Edward, Montreal
*DeLury, R. E., Ottawa
Fleming, James H., Toronto
Keays, J. L., London
Lloyd, Hoyes, Ottawa
Rowan, Wm., Edmonton
Saunders, W. E., London
Taverner, Percy A., Ottawa
White, G. R., Ottawa

DENMARK

Royal Library, Copenhagen

ENGLAND

British Museum Natural History, London
Zoological Society of London
Zoological Museum, Tring
Jourdain, F. C. R., Abingdon
Mathews, Gregory M., Foulis Court, Fair Oak

FRANCE

Museum Histoire Naturelle, Paris

Delacour, Jean, Paris

GERMANY

K. Zoologisches Museum, Berlin

Museum Zool. State-Sammlung, Munich

HOLLAND

Royal Museum Natural History, Leiden

RUSSIA

Zool. Museum Acad. of Sciences, Petrograd

SCOTLAND

Royal Scottish Museum, Edinburgh

SWEDEN

Royal Swedish Academy Sciences, Stockholm

—T. S. Palmer, Washington, D. C

THE ANNUAL meeting of the Royal Australasian Ornithologists' Union was held at the Hobart Museum, Hobart, Tasmania, November 6, 7, and 8, 1923. Dr. J. A. Leach was elected President and Editor of 'The Emu,' J. Cross, Secretary and Z. Gray, Treasurer. Reports were made by committees on State Branches, Bird Protection and Game Laws, Export of Australian Birds and on the Second Edition of the 'Check-List of Australian Birds.' On November 9, the members left Hobart for Adventure Bay for the annual camp-out.

PLANS for the next annual meeting of the A. O. U. have already been begun. The meeting will be held at the Carnegie Museum, Pittsburgh, Pa., Nov. 10–13, 1924. The Committee on Arrangements, appointed by the President, consists of W. E. Clyde Todd, Chairman, Witmer Stone and Lynds Jones.

FOLLOWING the practice of most present-day journals 'The Auk' is compelled to ask those submitting matter for publication to have it typed if possible. The corrections necessary when longhand manuscripts are submitted to the printer are a source of considerable extra expense as is also the typing of the manuscripts after their receipt by the editor.